

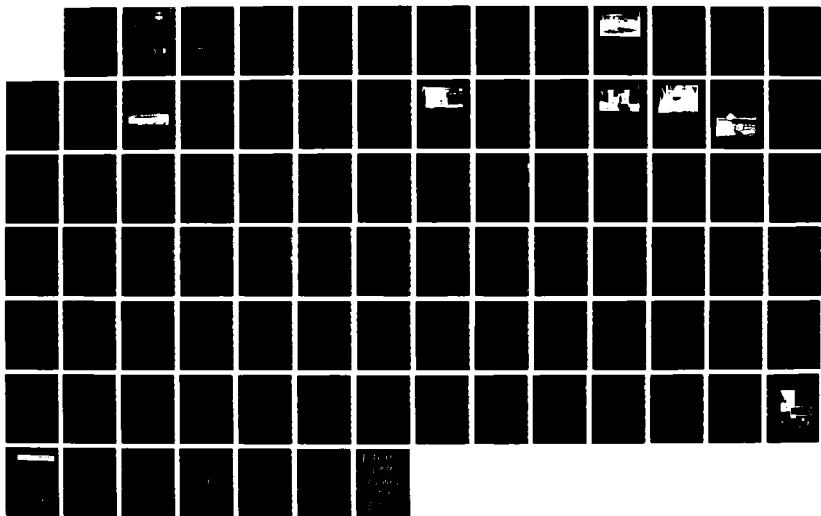
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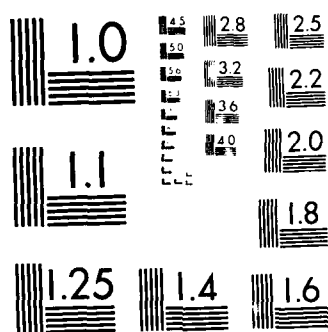
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USAFOEHL REPORT

88-057EQ0253DHH



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**Hazardous Waste Technical Assistance
Survey, Brooks AFB TX**

ROBERT A. TETLA, 1Lt, USAF, BSC
CHARLES W. ATTEBERY, 2Lt, USAF, BSC

April 1988

Final Report

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**USAF Occupational and Environmental Health Laboratory
Human Systems Division (AFSC)
Brooks Air Force Base, Texas 78235-5501**

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This report has been reviewed and is approved for publication.

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categorize all wastestreams and eliminate unnecessary waste sampling. (3) The centralized waste storage area should be upgraded to include: an impervious floor such as concrete, curbing, and protection to waste containers from the weather as outlined in the base Hazardous Waste Management Plan (OPLAN 19-3). (4) The washracks at the Auto Hobby shop should be connected to the sanitary sewer instead of discharging its effluent to the golf course pond. (5) The leaking tank at the BX Service Station should be pumped out and removed or repaired as soon as possible to prevent potential contamination of the grounds around the tank. (6) The laboratories and shops on BAFB should start logging the types of waste placed into each drum. This would eliminate the need to sample every waste drum leaving BAFB. (7) The base should consider finding a waste oil contractor similar to the one being used by the Auto Hobby Shop and the BX Service Station (Vegas Oil). This contractor comes to the base and pumps the underground waste oil tanks and pays MWR the current price of waste oil, usually anywhere from .5-1 cent per gallon.

ACKNOWLEDGMENT

The authors wish to thank the personnel at Brooks AFB who provided information and logistic support during our visit. We acknowledge the support given us by: Capt Smith, the base Radiation Protection Officer; 2Lt Wade Weisman, the base Bioenvironmental Engineer, and the staff of the Bioenvironmental Engineering (BEE) section; Mr Bill Humes, Chief of Facility Management; Mr Art Nanos, Chief of Supply; Mr Ken Small, Environmental Specialist (E. Kelly DRMO); and Mr Frank Edmondson, Assistant Staff Civil Engineer; during the survey.

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I. INTRODUCTION

In a 22 Jun 87 letter (Appendix A), Headquarters Joint Military Medical Command, USAF Clinic Brooks/SGPB, requested the USAF Occupational and Environmental Health Laboratory, Consultant Services Division, Environmental Quality Branch (USAFOEHL/ECQ) to perform a Hazardous Waste Technical Assistance Survey at Brooks Air Force Base (BAFB). The scope of this survey was to address hazardous waste management practices as well as explore opportunities for hazardous waste minimization.

The survey was conducted by 1Lt Robert A. Tetla and 2Lt Charles W. Attebery, USAFOEHL Hazardous Waste Function, USAFOEHL/ECQ, from 30 Oct 87 to 15 Jan 88. Since we are located on Brooks AFB, this survey took four months to complete because it was accomplished on time available between other base surveys.

II. BACKGROUND

A. Base Description

Brooks AFB is located in the southeast corner of San Antonio, Bexar County, Texas. The mission of Brooks AFB is research, education, clinical practice, and consultation in aerospace medicine. These activities are accomplished through Headquarters Human Systems Division (HSD) previously named the Aerospace Medical Division (AMD). Organizations located on base and involved with our survey include: the USAF School of Aerospace Medicine (USAFSAM), the 6570 Air Base Group (6570 ABG), the Drug Testing Laboratory (DTL), the USAF Occupational and Environmental Health Laboratory (USAFOEHL) and the San Antonio Real Property Maintenance Agency (SARPMMA).

B. Hazardous Waste Program

Prior to Dec 1986, waste chemicals were turned in to Base Supply (located in Bldg 1150) who stored the wastes temporarily (under 90 days) at the centralized waste storage area, Bldgs 1020/1030 (a grassy fenced-in area next to the stables, see Figure 1). Base Supply would then make arrangements with the Defense Reutilization and Marketing Office (DRMO), located at East Kelly AFB, to take accountability of the wastes; helped the waste generators fill out DD Form 1348-1 (Figure 2); and contacted the base Motor Pool to get a vehicle to pick up and transport the wastes to DRMO. However, in Dec 1986, DRMO refused to accept 96 drums of waste from Base Supply because DRMO felt that the wastes were not sufficiently analyzed. Chemical analysis of the wastes was done by infrared inspection (IR). Since 1 Feb 87, DRMO has refused to accept any waste without either a gas chromatography mass spectral (GCMS) chemical analysis or specific user knowledge (i.e., the generator keeping a log of the amount of waste that is placed into a drum by percentage) and proper paperwork to include a Texas Water Commission Uniform Hazardous Waste Manifest (Appendix B) along with DD Form 1348-1.



Figure 1. Centralized Waste Storage Area, Bldgs 1020/1030

DOC		STOCK NUMBER		QUANTITY		DOCUMENT NUMBER		SHIP TO		MARK FOR PROJECT		DATE		DOLLARS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SHIPPED FROM		SHIP TO				MARK FOR PROJECT				DATE		DOLLARS			
WAREHOUSE LOCATION		TYPE OF CARGO		UNIT WEIGHT		UNIT CUBE		UNIT PRICE		FREIGHT RATE		QUANTITY			
SUBSTITUTE DATE WHEN REQUESTED		FREIGHT CLASSIFICATION				ITEM NOMENCLATURE				DATE		DOLLARS			
SELECTED BY AND DATE		TOTAL WEIGHT		TOTAL CUBE		RECEIVED BY AND DATE		INSPECTED BY AND DATE		DATE		DOLLARS			
PACKED BY AND DATE		TOTAL WEIGHT		TOTAL CUBE		WAREHOUSE BY AND DATE		WAREHOUSE BY AND DATE		DATE		DOLLARS			
REMARKS		DATE SHIPPED				DATE SHIPPED				DATE SHIPPED		DATE SHIPPED			
FIRST DESTINATION ADDRESS		DATE SHIPPED				DATE SHIPPED				DATE SHIPPED		DATE SHIPPED			
TRANSPORTATION CHARGEABLE		DATE SHIPPED				DATE SHIPPED				DATE SHIPPED		DATE SHIPPED			

DD FORM 1348-1 (4 PART) 1 MAR 74

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Figure 2. DD Form 1348-1

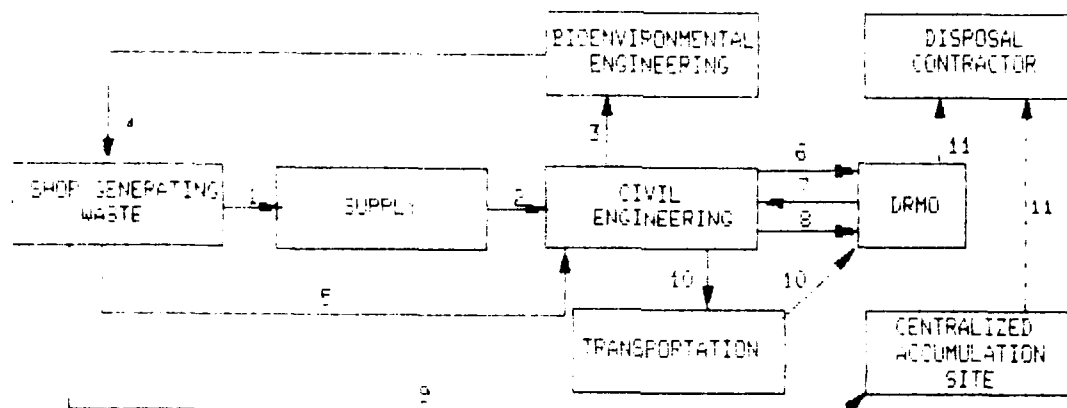
Afterward Base Supply sent out three letters (Appendix C) instructing generators to contact the base Environmental Coordinator, (ABG/DEEV), to get help completing the DD Form 1348-1, and to contact the base Bioenvironmental Engineer to request waste analysis.

Unfortunately, during our survey the base Environmental Coordinators position was vacant and was temporarily being filled by 1Lt Jorge Valazquez, Chief, Program Development, Civil Engineering, as an additional duty until an Environmental Coordinator is hired.

Currently, the generator of a waste fills out DD Form 1348-1, and contacts Base Supply who reviews the turn-in document to determine if it is a recoverable product. If the product is not recoverable, 1Lt Jorge Valazquez in Civil Engineering is contacted to coordinate with the base Bioenvironmental Engineer to sample the waste for analysis. The only time a waste drum does not have to be analyzed is if the drum was never opened and the contents of the drum is known (i.e., a chemical whose shelf life expired and was never opened). Once the drums' contents are analyzed, by the USAF Occupational and Environmental Health Laboratory, Analytical Services Division (USAFOEHL/SA), the results are returned to the Bioenvironmental Engineer who saves a copy for his records and forwards the results to the generator of the waste. The generator then forwards the DD Form 1348-1 and the analytical results to Civil Engineering. Civil Engineering reviews the DD Form 1348-1 and the analytical results, fills out the Texas Water Commission Uniform Hazardous Waste Manifest, and contacts DRMO to review the manifests, the DD Form 1348-1 and the analytical results.

After DRMO reviews the paperwork and approves it, the paperwork is sent back to Civil Engineering at Brooks AFB and an appointment is made to either bring the waste to DRMO or to have a contractor come to Brooks and pick up the waste. If the waste is to be picked up at Brooks AFB, the generator is responsible for getting their wastes to the Centralized Waste Storage Area, Bldgs 1020/1030, a day or two before the waste is to be picked up by the DRMO contractor. When the waste is picked up, the contractor checks the drum for proper labeling, condition, and paperwork before transporting the waste to a permitted disposal facility. After disposal of the waste in a permitted disposal facility, a signed copy of the completed manifest is returned to Civil Engineering at Brooks AFB for their records.

If the waste has to be transported to DRMO, the base Motor Pool transports it along with all paperwork to the DRMO facility at East Kelly AFB. Once at the facility, DRMO reviews the waste drums for proper labeling and condition. If correct, they accept accountability of the waste and the waste is left at the facility. If not, the waste is returned to Brooks AFB and repackaged and resubmitted for disposal. After the waste is properly disposed of a copy of the completed manifest is sent back to Civil Engineering at Brooks AFB for their records. For a summary of the turn-in procedure see Figure 3.



1. Shop has full drum of waste. The shop contacts supply after filling out DD Form 1348-1.
2. Supply determines if the waste is salvageable. If not, supply contacts Civil Engineering (CE).
3. CE contacts the Bioenvironmental Engineer (BEE) if the drum needs to be sampled.
4. The Bioenvironmental Engineer sends the analytical results to the shop.
5. The shop attaches the analytical results to DD Form 1348-1 and forward them to Civil Engineering.
6. Civil Engineering fills out the Texas Water Commission Uniform Hazardous Waste Manifest and gives the manifest and the DD Form 1348-1 to DRMO for review.
7. DRMO reviews the manifest and DD Form 1348-1 and returns the paperwork to CE.
8. Civil Engineering arranges waste transportation with DRMO.
9. The shop generating the waste transports it to the centralized accumulation site if a disposal contractor is coming to the base.
10. If the waste must be transported to DRMO, then Transportation takes the waste and all paperwork to DRMO. DRMO will either accept accountability of the waste or if there is a problem, send the waste back to Brooks.
11. The waste contractor is notified and either goes to DRMO or to the centralized accumulation site to pickup and take the waste to a Treatment, Storage and Disposal Facility where it is properly disposed of usually by incineration. The completed manifest is eventually returned to Brooks AFB and maintained in their records for a minimum of 3 years.

Figure 3. Summary of Turn-In procedures

III. PROCEDURE

The first step of the survey was to review the base's hazardous waste management plan, the Brooks Installation and Restoration Project Report, the Earth Technology Report on waste minimization and the Bioenvironmental Engineer's industrial shop folders. From our review we established nine categories of waste generated on Brooks AFB and developed a chemical waste disposal survey form (Appendix D) to inventory waste disposal practices on base. After this preliminary waste assessment, the survey team proceeded to visit all major industrial shops and laboratories on base to observe industrial activities and laboratory practices, discuss chemical waste disposal practices with laboratory/shop personnel, and handout the chemical waste disposal survey form.

The following individuals were contacted to discuss their respective areas of responsibility in the hazardous waste management program:

Capt Greg Smith, Base Radiation Protection Officer, Clinic/SGPH, AUTOVON 240-3417

2Lt Wade Weisman, Chief, Bioenvironmental Engineering Section, Clinic/SGPB,
AUTOVON 240-2020

1Lt Jorge Valazquez, Chief, Program Development, Civil Engineering Division,
AUTOVON 240-3252

Mr Bill Humes, Chief of Facility Management, USAFSAM/TSNF, AUTOVON 240-3128

Mr Frank Bradford, Roth Industries Inc., AUTOVON 240-2711

Mr Art Nanos, Chief of Supply, 6570 ABG/LGS, AUTOVON 240-2104

Mr Ken Small, Environmental Specialist, DRMO, East Kelly AFB, AUTOVON 945-4027

Mr Frank Edmondson, Assistant Staff Civil Engineer, 6570 ABG/DEP,
AUTOVON 240-3252

The information from our chemical waste disposal survey forms is summarized in Table 1. This summary shows the annual forecasted wastes generated on Brooks AFB by category (See Appendixes E and F for calculations). Table 1, Column 5, shows that waste oils, fluids, and antifreeze comprise 81.7% of all drummed wastes generated at BAFB and sent to DRMO. Waste oils and fluids are placed in either 55-gallon drums or one of two underground tanks (located at the BX Service Station and the Auto Hobby shop). Both the Auto Hobby shop and the BX Service Station have a contract with an oil recycler (Vegas Oil) to pick up waste oils and fluids. Waste oils and fluids generated by other organizations on base are sent to DRMO for disposal.

TABLE 1
CATEGORIES OF WASTE AT BROOKS AFB (BAFB)

CATEGORY	PRODUCT	TOTAL (Gal/yr)	TOTAL CATEGORIES DRUMMED (Gal)	%TOTAL CATEGORIES DRUMMED
1	Waste Oils	5754 ¹	2854 ^{1,2}	77.39
2	Photo Wastes	3385	---	---
3	Waste Paints & Thinners	371	358	10.44
4	Waste Acids	303	---	---
5	Used Antifreeze	224	78	2.11
6	Stripping Waste	176	170	4.61
7	Solvents	103	97	2.63
8	Waste Fluids	99	81	2.20
9	Fuels	50	50	1.36
Totals:		10,470	3,688	100.74

¹Waste oils do not include PCB contaminated oils since the SARPMA Electrical shop could not give an estimate of the amount of PCB contaminated oil generated on Brooks.

²Quantity of waste oils not including waste oils from the Auto Hobby shop and BX Service Station taken by a oil recycler.

Waste paints and thinners, waste fuels, waste solvents, used antifreeze, and waste strippers are placed in 55-gallon drums and disposed of through DRMO.

All other wastes generated on Brooks, i.e., photo wastes, some used antifreeze, and waste acids are disposed of down the drain.

IV. DESCRIPTION OF WASTE DISPOSAL PRACTICES FOR LABORATORIES AND SHOPS

This section contains a brief summary of our findings by organization while visiting the laboratories and shops on Brooks AFB.

A. 6570th Air Base Group (6570 ABG)

1. Reprographics (DAPR)
Shop Supervisor: Mr Arocha

Building: 570
AUTOVON: 240-3115

Reprographic personnel are responsible for supporting the printing requirements of the base. The shop contains a 2850 Multi Duplicator (offset press) and a Xerox high speed copier. Chemicals used in this shop include: a blanket wash (perchloroethane solution) that is generally used up in process (any remaining solution is stored and reused); a deglazing solvent

used on a gauze pad to wipe down the press; and an electroetch solution that is used up in process. No chemical waste is generated from this shop.

2. Fire Department (DEF)
Shop Supervisor: Mr Ramirez

Building: 640
AUTOVON: 240-3528

The Fire Department generates no chemical waste. Motor Pool personnel performs maintenance on fire trucks, a contractor services fire extinguishers, and the Pavements and Grounds shop services all grounds equipment used by the Fire Department.

Three-percent aqueous film forming foam (AFFF) is stored in a compartment on fire trucks and is automatically mixed with water when applied to a fire.

3. Auto Hobby Shop (SSRV)
Shop Supervisor: Mr Shaffer

Building: 698
AUTOVON: 240-2624

Personnel from the Auto Hobby Shop help patrons repair their privately owned vehicles. Waste oils and fluids from vehicles are drained into a 25-30 gallon drum. When full, the contents from the drum are drained into a 500-gallon underground tank that is pumped out by a waste oil contractor (Vegas Oil). This disposal contract is managed through Morale, Welfare and Recreation (MWR) and not through DRMO. The shop has a Safety Kleen degreasing unit serviced on a monthly basis. Used sand from the sandblasting unit is thrown in the trash when it is contaminated with paint. The used sand has never had an EP toxicity analysis to determine if it contains heavy metals.

All floor drains are interconnected and do not discharge to the sanitary or storm sewers. Any water entering the drains is eventually evaporated. The Auto Hobby shop also has a dry paint booth. Both patrons and the base Motor Pool use this booth to paint vehicles. The Auto Hobby Shop generates no waste paints and thinners because anyone painting a vehicle must leave the shop with everything he or she brought into the shop. A new dry paint booth and Auto Hobby Shop are scheduled to be built in the future. ALK 600 soap (NSN 5850-05-184-7453), diluted 10:1, is used to clean the floors.

4. BX Service Station (SEV)
Shop Contact: Mr Johnson

Building: 706
Commercial: 532-2191

The BX Service Station is an automotive garage whose services include dispensing gas and performing minor automotive repairs. Waste oils are placed in a 350-gallon underground storage tank and pumped out by Vegas Oil on a quarterly basis. This shop also has a Safety Kleen degreasing unit that is cleaned out on a monthly basis. Presently a 2000-gallon underground fuel tank (containing approximately 500 gallons regular gas and 1500 gallons water) is leaking. There is a work order (order # 25039, 22 Oct 87) submitted to repair the tank; however, no repairs had been made during the survey.

5. Vehicle Maintenance (LGTV)
Shop Supervisor: MSgt Crenshaw

Building: 1102
AUTOVON: 240-2626

The Vehicle Maintenance Shop maintains and repairs government vehicles and the major waste from this shop is engine oil. Waste oils and fluids are drummed and stored at the

shop's accumulation site (see Figure 4). This shop has two Safety Kleen units that are serviced once every two months. Waste paints and thinners, and waste antifreeze are placed in separate 55-gallon drums, stored at the shop's accumulation site, and taken to DRMO for final disposal. Unserviceable batteries are stored at the accumulation site on pallets and sold back to the contractor (Copars) where they were purchased. No neutralization of battery acid is done by personnel in Vehicle Maintenance (an inactive Battery Shop is located behind Bldg 1101). There are no floor drains in this building. All major vehicle painting is done at the Auto Hobby Shop. Minor touch-up painting is done in Bldg 1102. Waste paints and thinners are generated from cleaning painting equipment (about 5 gallons/month). Any unused paint is placed back in its original can. The vehicles serial number and work order number are placed on the can so the paint can be used later for touchup work.

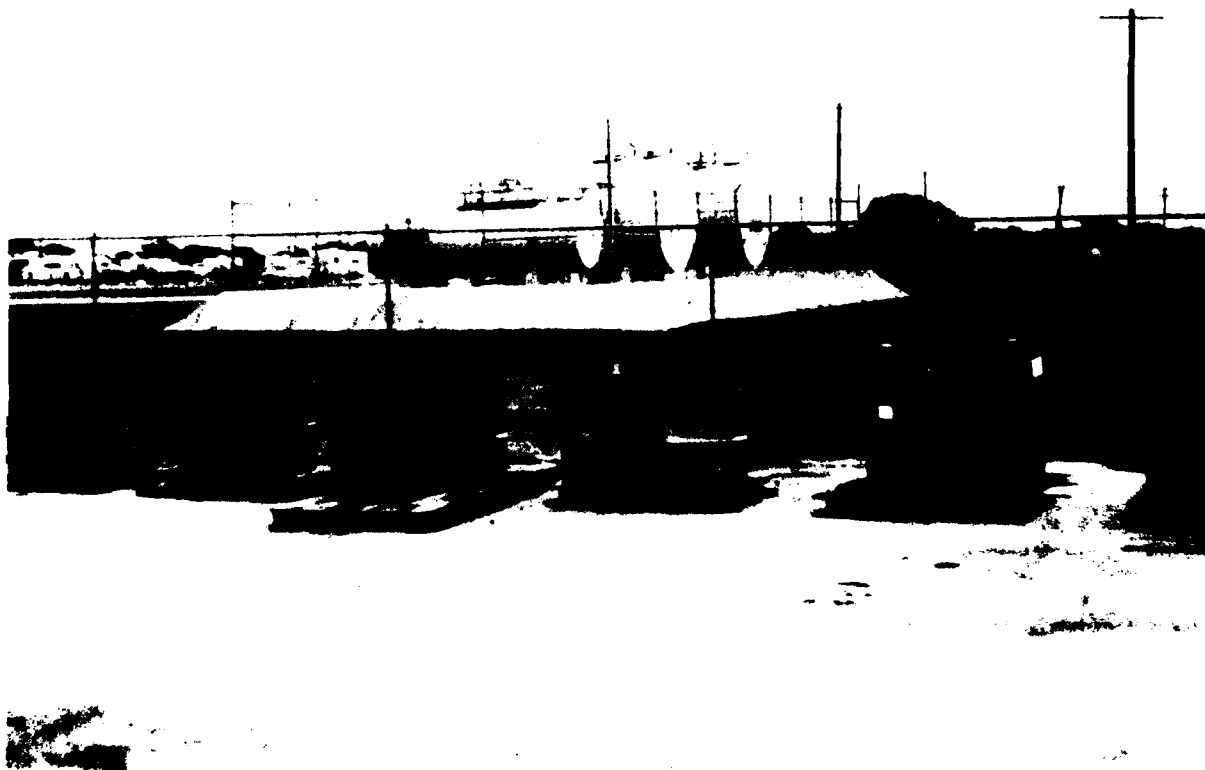


Figure 4. Vehicle Maintenance's Satellite Accumulation Site

B. Drug Testing Laboratory (DTL)

Drug Testing Laboratory (DL)
Lab Contact: MSgt Gorman

Building: 930
AUTOVON: 240-2961

The Drug Testing Laboratory is responsible for analysis of urine samples from all CONUS bases (this includes Alaska and the Panama Canal Zone) in support of the Air Force Drug Testing Program. The major waste from this lab is low-level radioactive urine (8 drums/month). These drums are turned over to the base Radiation Protection Officer (RPO), and stored at either Bldg 186 or near Bldg 1000 until background levels are reached before the drums are taken to a class I landfill by a contractor (BFI). Waste laboratory chemicals such as acids, chloroform, acetone, ethyl acetate, isooctane, and alcohol are poured down the drain (29 gal/month).

C. USAF Occupational and Environmental Health Laboratory (USAFOEHL)

1. Analytical Services Division (SA)

Building: 140

The Analytical Services Division provides analytical chemistry services in support of the Air Force's environmental and occupational health programs. This includes comprehensive analysis of biological, environmental (air, water, soil and vegetation) and industrial hygiene samples submitted by Air Force bases worldwide.

Waste chemicals are generated from the Commercial and Industrial Product Analysis Section, Heavy Metals Section, Trace Organics Section, and Pesticide Section. Wastes from the Commercial and Industrial Product Analysis Section and the Heavy Metals Section are combined (i.e., the samples are placed into one of two drums). The other two sections take care of their own wastes.

a. Commercial and Industrial Product Analysis Section (SAO) Lab Contact: TSgt Wantland

Building: 140
AUTOVON: 240-3626

Wastes generated in this section are from samples sent to USAFOEHL for hazardous wastes analysis. Samples are analyzed by infrared spectroscopy for major components, corrosivity (pH), and ignitability before being sent to the Heavy Metals Section for EP Toxicity testing. After EP Toxicity testing, the samples are returned to this section and placed in separate 5-gallon containers (stored in a freezer located next to room 70), designated for petroleum waste and solvent waste. When ten 5-gallon containers of a specific waste type are accumulated, a 55-gallon drum is obtained and the wastes in the 5-gallon containers are poured into the drum. A sample is taken of the drum and analyzed by this section. Afterward, a DD Form 1348-1 is filled out for the waste drum and is turned over to civil engineering. When DRMO accepts the waste, personnel from the USAFOEHL laboratory take the waste to the centralized hazardous waste storage site on a specific date where it will be taken away for proper disposal.

b. Heavy Metals Section (SAO) Contact: Mr Hrma

Building: 140
AUTOVON: 240-3626

This section runs analyzes for heavy metals using the EP Toxicity test. Heavy metals are removed from solid samples by leaching with a shaker; while multilayered liquids are placed in a separatory funnel to remove the water layer. The water layer is then digested and tested for the eight heavy metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver) using atomic absorption. Samples sent to this section are held until the base receives the analytical results. After the results are received, the waste samples are given to the Commercial and Industrial Product Analysis section for disposal.

c. Trace Organics Section
Contact: Lt Migdal

Building: 140
AUTOVON: 240-3626

This section does polychlorinated biphenyls (PCBs) in house, and contracts out EPA Test Methods 604, 610, 9020 and Total Organic Halides (TOX). Waste oils from PCB analysis are placed in one of three 5-gallon drums depending on the level of PCB (either under 50 ppm, 50-500 ppm, or over 500 ppm PCB) and when full sent to DRMO for disposal. The oils are drained from their container into the respective drum and the containers are placed in a box containing an absorbent material, i.e., vermiculite, and then disposed of as municipal waste. This section averages about 50-100 PCB samples per week with each sample generating anywhere from 5-100 ml of waste oil.

Soil samples submitted for PCB analysis are first dried under a laboratory hood and then the PCBs are extracted using isooctane. The soils are then re-dried under a hood and thrown in the trash.

This section also analyzes swipe samples for PCB contamination. Gauze pads from swipe samples are rinsed in isooctane to extract any PCBs from the pad. The isooctane solution is then tested for PCBs and placed in a 5-gallon Teflon lined bucket and evaporated in a laboratory hood. The gauze pads are thrown in the trash after the extraction. On an average the lab does five swipe samples per month and each swipe sample uses about 40 ml of isooctane per sample.

d. Pesticide Analysis Section
Contact: Dennis Mark

Building: 140
AUTOVON: 240-3626

The Pesticide Analysis Section provides the Air Force with pesticide analysis capability. The analysis is accomplished using either a GCNPD (gas chromatograph nitrogen phosphorous detector) or a GCECD (gas chromatograph electron capture detector). Wastes generated are pesticide samples and standards. Test solutions are evaporated in a laboratory hood after analysis, leaving only dried pesticide residue (1-2 grams per month). This residue is typically put into lab-packs and disposed of by DRMO. However, DRMO is currently not accepting any lab-packs so the waste is being held by the lab.

2. Radiation Services Division
Contact: SSgt Gage

Building: 140
AUTOVON: 240-2061

The Radiation Services Division provides health physics support and radioanalysis of all types of radionuclides for biological, environmental, and industrial samples Air Force-wide.

Radioactive sources are the only sources of hazardous waste. Sources below the Nuclear Regulatory Commission radiation limits for alpha, beta, and gamma radiation are disposed of as municipal wastes or discharged down the drain. Sources above the limits are logged and placed in a 35-gallon barrel located in a controlled area. The barrel is picked up by USAFSAM/RZ when full and held for 10 half-lives (to reach background levels) before disposing as municipal waste or if the waste contains both radiological and hazardous waste, it is first held for 10-half-lives and then disposed of as a hazardous waste. Very little waste is generated in the division, i.e., only one barrel has been picked up by USAFSAM/RZ in the past three years.

D. USAF School of Aerospace Medicine (USAFSAM)

1. Comparative Pathology (VSP)
Lab Supervisor: TSgt Ramos

Building: 125
AUTOVON: 240-3554

Comparative Pathology performs autopsies on sacrificed laboratory animals. In accordance with standard autopsy procedures this lab collects tissue, blood, feces, skin, hair and bacterial samples which are cut and stained for microscopic examination. No waste from this lab is disposed of through DRMO and all chemicals are used up in process. Biological wastes are incinerated in the pathological incinerator located near Bldg 1006.

2. Anatomical Pathology (VSP)
Lab Supervisor: TSgt Bumgarner

Building: 125
AUTOVON: 240-3554

This lab provides clinical support (i.e., hematology, parasitology, bacteriology chemistry, urinalysis) to the research animal colony on base. All chemicals are flushed down the drain with water.

3. Neuro Sciences Lab (NGNS)
Lab Supervisor: Dr Terrian

Building: 125
AUTOVON: 240-3202

This lab is responsible for basic research on optimizing human performance through the understanding of mechanisms regulating neuronal responsiveness. All chemicals (acetone, methanol, and acids) used in this lab (approximately 2.5 gal/mo) are used up in process.

4. Electron Microscopy (VS)
Lab Supervisor: Mr Butcher

Building: 125
AUTOVON: 240-3554

The Electron Microscopy Lab processes tissue for transmission and scanning electron microscopy. This includes: cutting plastic embedded tissue; darkroom procedures; making reagents and stains; and using the transmission and scanning electron microscope to screen and diagnose tissues. All chemicals used in this laboratory are used up in process.

5. Base Audio Visual Information
Center (TSY)
Lab Supervisor: Sgt Gary

Building: 130
AUTOVON: 240-2882

Base Audio Visual Information Center personnel are responsible for developing, processing and printing photographs in support of the base. The laboratory is divided into four sections: the Photomicrography Section, Copy Section, Color Section, and Black and White

Section. Except for the Black and White Section all sections use fixers and developers. The used developers are discharged down the drain. Used fixers and black and white paper are turned in to base supply for silver recovery. All other chemicals (bleach, activator, stopper and stabilizer) are poured down the drain when they become ineffective.

6. Fabrications (TSY)
Shop Supervisor: Mr McDougall

Building: 130
AUTOVON: 240-3327

Fabrications shop personnel provide design and manufacturing services to the School of Aerospace Medicine, and to all tenant organizations on Brooks AFB. Waste acids are neutralized and poured down the drain (150 gallons/2 yrs). This shop has a 25-gallon PD-680 tank that is changed out annually. Waste PD-680 is drummed and disposed of through DRMO.

7. Repair and Calibration Lab (TSNM)
Lab Supervisor: Mr Vincent

Building: 167
AUTOVON: 240-2230

The Repair and Calibration Laboratory is broken into different sections: Calibration Lab, Electronic Maintenance Section, Medical Maintenance Section, Welding Section, and Painting Section.

The Calibration Lab calibrates equipment on base. The only waste from this shop is mercury from occasional spills. Spilled mercury is sucked up with a mercury vacuum pump and usually sold to a mercury recycling contractor through base supply, otherwise it is turned in to DRMO for disposal.

Electronic Maintenance is run by contract and the section repairs electronic equipment such as: televisions, VCRs, tape players, scales, and balances. No waste is generated from this section.

Medical Maintenance personnel maintain electronic equipment that is not on a maintenance contract. This section has an ultrasonic cleaner used for parts cleaning. When the general purpose soap in the cleaner is dirty, it is poured down a drain to the sanitary sewer. This shop is also responsible for servicing the centrifuge located in Building 170. Waste oil from the centrifuge is drummed, stored at a designated accumulation site outside building 167 (see Figure 5), and is sampled by Bioenvironmental Engineering. The waste oil is sent to DRMO after the analytical results are received.

The Welding Section is responsible for welding and repairing metal parts, such as welding broken monkey cages. No wastes are generated from this section.

The Painting Section is responsible for painting and stripping equipment parts on the base. This section has a 110-gallon stripping tank (containing Magnaflux Stripper, NSN 6850-00-543-7801) that is changed out as needed. Waste stripper is placed in 55-gallon drums, stored at the lab's designated accumulation site, sampled by Bioenvironmental Engineering, and eventually turned in to DRMO.



Figure 5. Repair and Calibration Lab's Satellite Accumulation Site

8. Systems Engineering (VNC)
Shop Supervisor: Mr Meeker/Mr White

Building: 170
AUTOVON: 240-3811

Systems Engineering provides facility, engineering, technical, and equipment support for the Crew Technology Division. Antifreeze is added to the cooling systems of the environmental and altitude chambers. Paints and thinners are occasionally used (less than 1 gallon/month). Methylene chloride is used in the temperature control system of the environmental and altitude chambers, but no waste methylene chloride is generated. Scheduled oil changes for the centrifuge are every 1000 hours of use, and the waste oil is drummed, stored at the Repair and Calibration Lab's accumulation site (located next to building 167), and eventually turned in to DRMO.

9. Crew Protection, Chem Defense (VNC)
Lab Supervisor: Dr Conkle

Building: 170
AUTOVON: 240-3159

This lab researches chemical war agent simulants. A one-to-one ratio of methanol and a .1N solution of sodium hydroxide is used in this lab. Approximately five gallons of this solution is used per week and any unused solution is poured down the drain. No wastes from the lab go to DRMO for disposal.

10. Crew Systems (VNL)
Lab Supervisor: Dr Ikels

Buildings: 160/161/170
AUTOVON: 240-3361

This laboratory does research, tests and evaluates onboard oxygen generation systems. The major chemical used is zeolite (a molecular sieve) that is disposed of as municipal waste after use (10 lb/mo). The lab also uses a small amount of other chemicals such as alcohols and methyl ethyl ketone (2 pints/month, combined). No wastes go to DRMO for disposal.

11. Radiation Protection Radiological
Effects Section (RZP)
Lab Supervisor: Mr Hardy

Building: 175E
AUTOVON: 240-3416

The Radiological Effects Section does biological experiments utilizing radiation (lasers, microwave, ionizing) on small animals. Minimal wastes are generated from this lab. Chemicals such as P32, Ca45, C14 and Tritium are used in this lab. Radiologically contaminated wastes, such as gloves and aprons, from the experiments are placed in a small barrel (about 20-gallon capacity) for solid wastes and disposed of as municipal waste. Liquid wastes are placed in a small liquid container (about 2-gallon capacity). When the liquid container is full (once every 2 months), it is turned over to the Radiation Protection Officer (RPO) for disposal. All chemicals with a half-life of under 65 days are held for 10 half-lives (approximately 2 years) at which time the liquid should be at background levels and can be disposed of as municipal waste.

12. Radiation Protection Radiological
Physics Branch (RZP)
Lab Supervisor: Mr Merritt

Building: 175E
AUTOVON: 240-3583

The Radiological Physics Branch does research on radio frequency radiological biological effects. Most of the wastes from this section are biological and are autoclaved before disposal as solid waste. Other chemicals (e.g., methanol, buffers) are used in minute quantities (ml/day) and are disposed of down the drain.

13. Chemical Defense Function Radiation
Branch, (RZA)
Lab Supervisor: 1Lt Kerenyi

Building: 186
AUTOVON: 240-3684

This laboratory is responsible for evaluating the effects of prophylaxis and treatment drugs (e.g., atropine) on performance lethality in Soman exposed animals. Waste soman is taken to the pathological incinerator located near Building 1006 and burned.

The laboratory also does some biochemical assays and neurohistology using Carbon 14 (C14) and other radioisotopes. Waste liquid C14 from experiments is containerized and turned over to the Radiation Protection Officer (RPO) for storage at one of the low-level radioactive accumulation sites (either behind Bldg 186 or in Area 1000). This laboratory has a low level radioactive accumulation site located on the northeast side of the building.

14. Epidemiology, Entomology (EKED)
Lab Contact: Lt Col Pinkovsky

Building: 930
AUTOVON: 240-3751

This lab performs tests to determine the resistance of insects to pesticides. They also validate bases that require aerial application of pesticides and identify mosquitoes. Waste pesticide standards are diluted and discharged to the sanitary sewer.

15. Epidemiology, Laboratory Services (EKL)
Lab Contact: SSgt Schwartz

Building: 930
AUTOVON: 240-3592

This lab processes samples to aid in the diagnosis of hepatitis, AIDS, influenza, and other communicable diseases. Immunological techniques are used involving radioisotopes (i.e., I-125 and Co-157) to identify certain antibodies. All dry wastes are autoclaved before being drummed, and when full, the drums are taken to a low-level radioactive storage area (Area 1000) where they are held for ten half-lives until background levels are reached. The drums are then taken by BFI to a municipal landfill.

16. Chemical Defense (VNC)
Lab Supervisor: Mr Miranda

Building: 1192
AUTOVON: 240-2323

The Chemical Defense Section is responsible for testing various methods of decontamination for personnel exposed to chemical agents in a wartime scenario. A methyl salicylate solution (.1 N NaOH, methanol, methyl salicylate and a dye) is used on trainees in chemical defense gear being processed through a mock up of the Survivable Collective Protection System-Medical (SCPS-M, a type of decontamination line). Clothing from this training exercise is sent to a contract laundry for cleaning. Occasionally, epoxy paint is used on the inside of Building 1192. Empty paint cans are thrown in the trash. No waste chemicals are disposed of through DRMO from this section.

D. SA Real Property Maintenance Agency (SARPMA)

1. Climate Control Heating Plant (DEMAMC)
Shop Supervisor: Mr Pollok

Building: 165
AUTOVON: 240-3357

SARPMA Climate Control personnel are responsible for operating and maintaining the central heating and cooling plant on Brooks AFB. Most of the chemicals (e.g., sulfuric acid, algicide, dispersants) are for water treatment and no chemical wastes are generated. Occasionally, waste oils are produced from maintenance on the refrigeration pumps. These oils are drummed, stored under Cooling Tower 3 (see Figure 6), sampled by Bioenvironmental Engineering, and eventually turned over to DRMO for disposal.

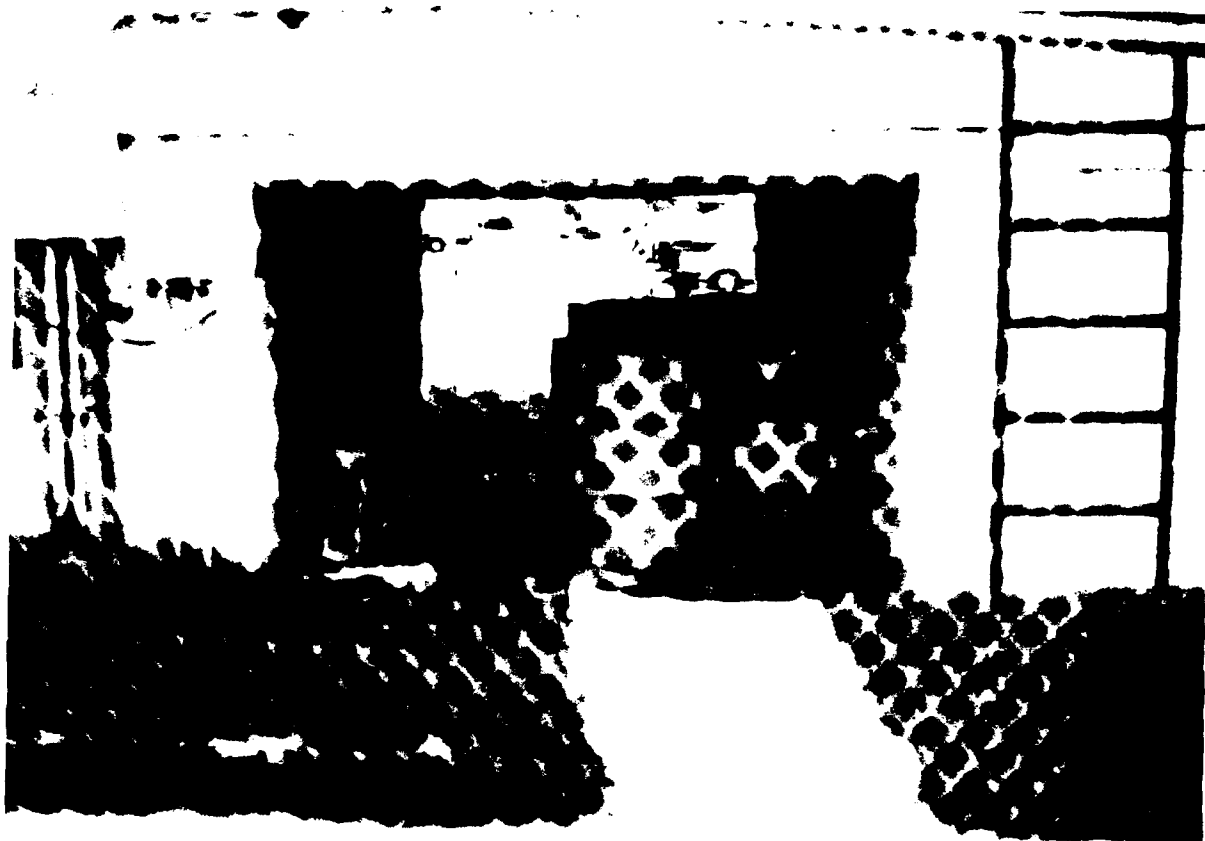


Figure 6. Heating Plant's Satellite Accumulation Site

2. Pavements and Grounds (DEMAPG)
Shop Supervisor: Mr Tarin

Building: 609
AUTOVON: 240-2734

SARPMA Pavements and Grounds personnel repair roads and sidewalks, and maintain recreational areas and lawns. Grounds personnel operate tractors and lawn mowers for herbicide spraying and grounds maintenance. All herbicides are stored in a small building (Bldg 634a) next to Building 634. Empty herbicide cans are triple rinsed and punctured before being placed into a dumpster. Rinsewater is put back into the spray tank for reuse. Antifreeze, hydraulic fluid and motor oil are only used to "top off" fluid levels in machinery. Waste oils are placed in a drum (see Figure 7) and when full, the drum is kept on-site until the waste can be taken to DRMO. The shop has two Safety Kleen degreasing units (changed out on a monthly basis) used for parts cleaning.

Vehicles are washed inside with Tide soap and the rinsewater drains into the sanitary sewer.

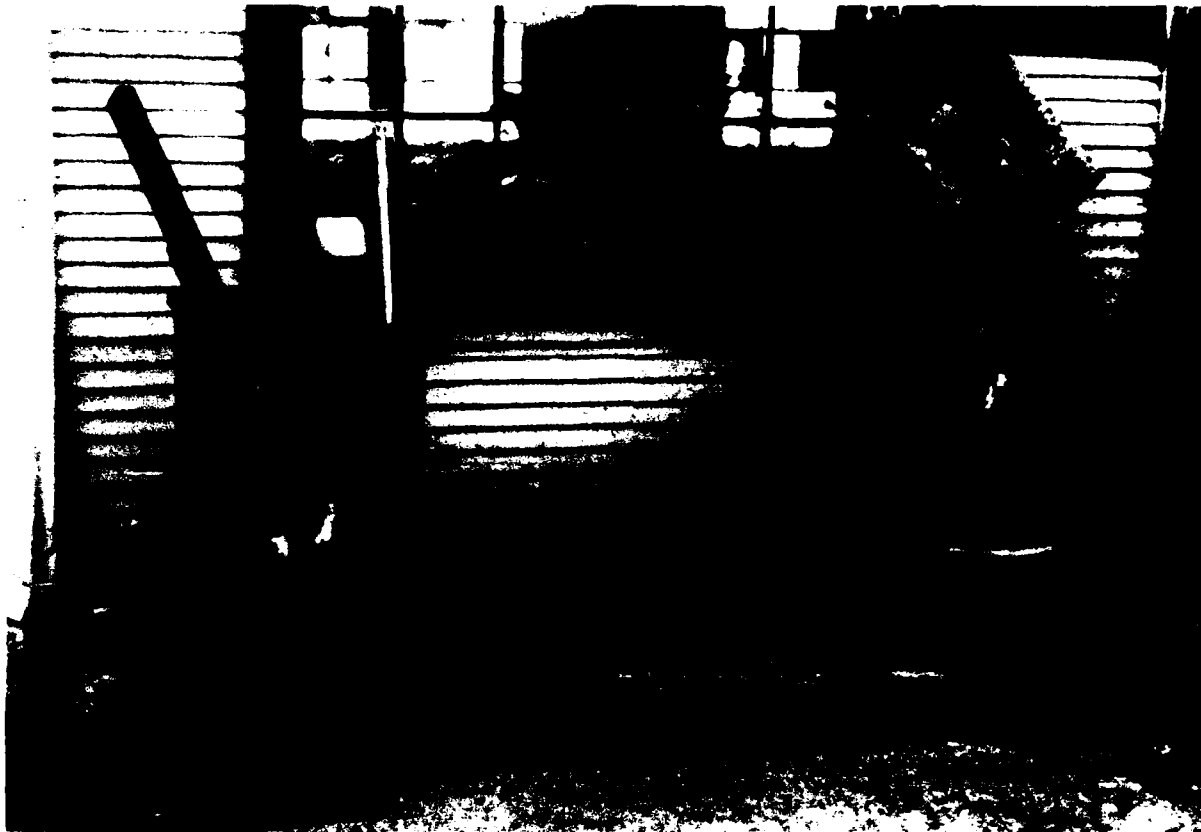


Figure 7. Pavements and Grounds' Satellite Accumulation Site

3. Electric (DEMAFE)
Shop Supervisor: Everett Macon

Building: 629
AUTOVON: 240-2240

Electric shop personnel install and maintain primary and secondary electrical circuits and equipment. This shop is also responsible for disposing of transformers and transformer oil containing polychlorinated biphenyls (PCBs). Waste oil containing PCBs is drummed, tested by the Bioenvironmental Engineering Section and currently stored at the civil engineering open storage yard (located on the old flight line) until a contractor can be found by DRMO for disposal.

4. Entomology (DEMAMS)
Shop Supervisor: Mr Higdon

Building: 629
AUTOVON: 240-2707

The SARPMA Entomology shop is responsible for pest control throughout the base. Most chemicals from this shop are used up in process. Any unused chemicals are drained and stored in containers for reuse at a later time. Liquid from triple rinsing the containers is stored in two separate containers (one 15-gallon container for Baygon and another for Dursban) for reuse. No wastes are generated from this shop.

5. Power Production (DEMASEP)
Shop Supervisor: Mr Jones

Building: 629
AUTOVON: 240-2240

SARPMA Power Production personnel operate and maintain emergency gas and diesel powered generators. The shop has a Safety Kleen degreasing unit which is cleaned out monthly. Waste oils, contaminated diesel fuel, and used antifreeze are placed in separate drums and stored at the accumulation site (Figure 8) for this shop, located next to the Battery Shop (Bldg 636). Drums are stored until they can be turned in to Base Supply and eventually disposed of by DRMO.

The Battery Shop is also operated by Power Production Shop personnel. Battery acid is neutralized in a process consisting of two drums. A used battery is inverted and allowed to drain its acid into the first drum that contains limestone rocks on the bottom. Acid from the first drum then drains into a second drum where it is mixed with sodium carbonate until the solution reaches a pH of about 7. Finally, the neutralized solution is drained into a 5-gallon container and poured into a sink leading to the sanitary sewer. The empty batteries are turned in to DRMO for salvage.



Figure 8. Power Production's Satellite Accumulation Site

6. Climatic Control (DEMAMC)
Shop Supervisor: Mr Cain

Building: 633
AUTOVON: 240-3148

Climatic Control personnel are responsible for maintaining air conditioning and heating systems base-wide. A minimal amount of waste oil is generated in this shop (2 gal/mo). This waste oil is placed in a drum located at SARPMA Pavements and Grounds. All other chemicals (soaps, sodium nitrate and acids used in water conditioning) are disposed of down the drain.

7. Paint Shop (DEMASC)
Shop Supervisor: Mr Smith

Building: 633
AUTOVON: 240-2126

Paint shop personnel are responsible for painting buildings and occasionally signs. Latex and enamel paints are exclusively used. Waste paints and thinners are drummed and stored at the Paint Shop's accumulation site until they can be turned in to Base Supply for disposal by DRMO.

V. SUMMARY OF GENERAL WASTE DISPOSAL PRACTICES

The waste disposal practices for different categories of waste are summarized in this section. A summary of disposal practices by laboratory and by shop is contained in Appendix G.

1. Waste paints and thinners are stored in 55-gallon drums and disposed of as hazardous waste.
2. Waste strippers are stored in 55-gallon drums and disposed of as hazardous waste.
3. The Power Production Shop neutralizes battery acids before rinsing it down the drain. Vehicle Maintenance returns used batteries to the contractor where the batteries were purchased; no neutralization is done by Vehicle Maintenance.
4. Waste oil from shops is kept at a designated accumulation site in either 55-gallon drums or underground waste oil storage tanks. Waste oil from the BX Service Station and the Auto Hobby shop is stored in 350-gallon and 500-gallon underground storage tanks respectively, and is picked up by a waste oil contractor (Vegas Oil). All other waste oil is drummed and turned in to DRMO at East Kelly AFB as hazardous waste.
5. PCB contaminated oil from transformers and empty transformer housings are stored at Bldg 1020/1030 and in the CE open storage yard (located on the old flight line) until a disposal contractor can be found.
6. Waste fluids (i.e., transmission, brake, hydraulic) generated on base are mixed and disposed of with waste oil.
7. Waste fuels are drummed and disposed of through DRMO as hazardous waste.

8. Most waste antifreeze from vehicle radiators is drained to the sanitary sewer. The Vehicle Maintenance Section drums waste antifreeze and turns it in to DRMO for disposal.

9. Fixer wastes and black and white paper from the Audio Visual Information Center are drummed and turned in to Base Supply for silver recovery.

10. Empty paint spray cans are disposed of as municipal waste.

11. Empty pesticide cans are triple rinsed and punctured before being disposed of as municipal wastes. The rinsewater is stored and reused.

12. Radioactive Wastes: The waste disposal method for radioactive wastes varies depending on the half-life of the radioactive material. If a material has a half-life of less than 65 days (e.g., I-125), the waste is drummed and held on base for 10 half-lives (approximately 2 years), before it is taken away by the contractor (BFI) as municipal waste. Small amounts of some liquids are poured down the drain. Waste with radioactive components having half-lives longer than 65 days, such as Co-57, are drummed and stored while awaiting disposal by a DRMO contractor (one drum every 2-3 months).

Radiological waste containing a hazardous waste is held for 10 half-lives and then disposed of as a hazardous waste.

13. Safety Kleen units are used by the base Motor Pool, the BX Service Station, Auto Hobby Shop, SARPMA Power Production and SARPMA Pavements and Grounds.

14. Most waste solvents are drummed and disposed of as hazardous waste. Laboratories using small amounts of solvent as standards pour the solvent down the drain. This procedure is acceptable as long as "neither the annual average total wastewater flow nor the combined annual average waste concentration exceeds 1 percent or 1 ppm respectively of the flow into the headworks of the plant's wastewater treatment or pre-treatment system" as outlined in 40 CFR 261.3 (E).

VI. OBSERVATIONS AND CONCLUSIONS

1. Currently there is no Environmental Coordinator at Brooks AFB to manage the hazardous waste program. As a result, the management of hazardous wastes has been informally delegated to: Base Supply; the Chief, Program Development, Civil Engineering Division; the Bioenvironmental Engineer; the Transportation Squadron; and the generators of the wastes. Base Supply has the responsibility of reviewing all turn-in documents and determining if the wastes are considered hazardous. The Chief, Program Development, Civil Engineering Division has the responsibility for contacting DRMO to transfer the wastes to DRMO and filling out the Texas State Uniform Manifest (see Appendix B). The Bioenvironmental Engineer samples wastes leaving Brooks AFB on an as needed basis. The Transportation Squadron is responsible for transporting wastes to DRMO when a contractor does not pick up the wastes on base. Each shop generating waste is responsible for transporting their wastes to the centralized hazardous waste storage facility, Bldg 1020/1030, on base and filling out DD Form 1348-1.

2. Brooks AFB has virtually no baseline chemical analysis to characterize wastestreams. Waste generators are responsible for placing the wastes into proper containers, and when the containers are full they call the Bioenvironmental Engineer to sample the waste before it is turned in to DRMO. The Bioenvironmental Engineer has to sample every drum of waste before disposal through DRMO because the wastestreams on base are not properly identified and the laboratories and shops are not keeping logs of what goes into their waste containers. This procedure increases the amount of money, time and effort of managing hazardous waste.

3. Battery acid from SARPMA Power Production is neutralized with sodium bicarbonate using a process consisting of two drums. A used battery is inverted and allowed to drain its acid into the first drum that contains limestone rocks on the bottom. Acid from the first drum then drains into a second drum where it is mixed with sodium carbonate until the solution reaches a pH of about 7. Finally, the neutralized solution is drained into a 5-gallon container and poured into a sink leading to the sanitary sewer. No analysis has been done to determine if the neutralized acid contains heavy metals.

4. Most of the waste storage sites on base are not on an impermeable floor, secured, diked with a valve in the berm to drain rainwater accumulation or covered (See Appendix H for the listing and status of hazardous waste accumulation sites on base). Secured waste storage sites would discourage intentional or unintentional cross-contamination of wastes. Also, managers of the satellite accumulation sites must be thoroughly familiar with proper waste handling and emergency procedures and "must post the following information next to a phone: the emergency coordinators name and phone number; the location of fire extinguishers, spill control material, and fire alarms; and the fire departments telephone number." ⁷

5. The Base Audio Visual Information Center, Building 110, collects all waste fixers and black and white paper and turns them in to the precious metal recovery officer at Base Supply for silver recovery. Supply personnel use litmus paper to check for silver discharge in the effluent of the silver recovery process.

6. The base uses product substitution to reduce the usage of PD-680 by contracting with Safety Kleen Corporation. A Safety Kleen employee services each Safety Kleen unit (if needed), drains the used degreasant and refills the unit on a designated schedule for each shop.

7. Both the Auto Hobby shop and the BX Service Station have a waste oil contractor (Vegas Oil) pump out their underground storage tanks. This reduces the amount of waste oil sent to DRMO. This contract is through MWR.

8. The washracks at the Auto Hobby shop are connected to the golf course pond. The flow to the golf course pond was verified by the Bioenvironmental Engineer using a fluorescent dye. Therefore, any chemicals from maintenance and washing cars (i.e., draining the radiator) enters the pond without treatment.

9. There is no formal hazardous waste training on Brooks AFB as outlined by the Brooks AFB Hazardous Waste Management Plan (OPLAN 19-3). The plan states that the Chief

of Safety (SE) will "Provide safety and hazardous waste training and procedures required by regulations to appropriate base personnel. The SE will be assisted by the base Bioenvironmental Engineer, the Fire Department and the Environmental Engineer." ⁷

10. The base has a chemical storage facility (Bldg 135) where 10 organizations on base store laboratory chemicals. A contractor from Roth Industries performed an inventory of the building and found that it contained many outdated chemicals. He has a complete listing of all chemicals in the building along with a listing of all outdated chemicals.

11. The radiation protection officer is attempting to get a permit through the Air Force Radioisotope Committee from the Nuclear Regulatory Committee (NRC), to eliminate storing radioactive chemicals, that have half-lives of 65 days or less, for 10 half-lives before being disposed of as municipal waste or poured down the drain. Obtaining a permit would eliminate the low-level accumulation sites and the large amount of low-level radioactive wastes now stored on BAFB.

12. Brooks AFB has an EPA permit to temporarily store and transport hazardous waste materials. Under the permit, Brooks AFB is allowed to accumulate hazardous materials for a period of up to 90 days. At that time it is transported to DRMO at Kelly AFB for final disposal. In addition, each accumulation site must not exceed 55-gallons of hazardous waste or one quart of acutely hazardous waste before removal to the central accumulation site. If the quantity of waste stored at the accumulation site exceeds these limits the accumulation site will then have to meet the requirements outlined in 40 CFR 262.34.

13. The Repair and Calibration Lab has had chemicals at their accumulation site for over 90 days as a result of acceptability of analytical results, i.e., DRMO refused to accept the waste because the chemical analysis of the drums contents was first too general and then too specific. This problem has been resolved but keeping wastes at an accumulation site in excess of 90 days is a violation of 40 CFR 262.34 and the EPA permit.

14. The Bioenvironmental Engineer uses either a disposable COLIWASA or a disposable drum thief to collect representative samples of the constituents inside the waste container. Since disposable samplers are used, they can be placed in the sample container and disposed of with the waste after use. This eliminates the time lost cleaning the sampler, the problems with storing and disposing of the solvent used to clean the sampler, and the potential for cross contamination during subsequent use.

15. Sand or glass beads from the sandblasting unit in the Auto Hobby shop are thrown in the trash when they are dirty. The media has never been tested to see if it contains heavy metals.

16. The Transportation Section has an EPA identification number to transport wastes to DRMO from Brooks AFB as outlined in 40 CFR 263.11

17. Presently the BX Service Station has a 600-gallon underground tank that is leaking. Fuel has not been drained from the tank and no repairs have been made.

18. According to OPLAN 19-3, accumulation sites on Brooks AFB can store up to 55-gallons of hazardous waste or one quart of acutely hazardous waste before transfer to the Central Accumulation Facility (Bldg 1020/1030).

VIII. RECOMMENDATIONS

1. Brooks AFB needs an Environmental Coordinator to be responsible for the management of the hazardous waste program. Currently, Civil Engineering, Transportation, Base Supply, Bioenvironmental Engineering, and the laboratories and shops generating the wastes are all involved in an unstructured program. A program is necessary to streamline the waste disposal efforts.

The Environmental Coordinator should be responsible for having wastestreams identified, training accumulation site managers, maintaining records (manifests, sampling results, training logs, monthly waste summaries, etc.) and coordinating with DRMO. The Bioenvironmental Engineer should be responsible for identifying and sampling wastestreams, drums, tanks and assist the Environmental Coordinator in training and education. The Chief of Transportation should support transportation requirements in terms of transferring wastes to the centralized accumulation site on Brooks, currently Bldgs 1020/1030, and transporting the wastes from Brooks AFB to DRMO at East Kelly AFB. Finally, the laboratories and the shops should have designated accumulation site managers responsible for segregating the wastes and maintaining a log of waste going into drums to eliminate the need for sampling every drum of waste leaving the base.

2. Brooks AFB needs to develop a waste analysis plan. This plan should consists of: a complete listing of all known wastestreams with a brief description of the process or operation generating the waste; the results of a baseline chemical analysis (to fully characterize the waste); the required analysis frequency; the sampling technique; and the parameters of analysis (see Table 2). The waste sampling analysis plan will allow the base to establish, within a reasonable time, documented rationale for classifying each wastestream as either hazardous or nonhazardous. For example, neutralized battery acid is disposed of as nonhazardous waste, yet, it has not been adequately analyzed for heavy metals to substantiate whether or not it is hazardous or nonhazardous.

3. Accumulation sites (Storage sites that can hold wastes for up to 90 days) should be kept "to protect human health and environment, and reduce the likelihood of damages or injuries caused by leaks or spills." Containers must meet the requirements listed in Table 3, and should be located on an impermeable floor (such as a concrete pad, preferably curbed with a valve in the curb to drain any water accumulating in the cubed area) to prevent contamination of the ground below the drums in the event of a spill. If the quantity of hazardous waste exceeds 55-gallons (or one quart acutely hazardous waste) then these sites must be curbed, covered, secure, and on an impermeable pad. Currently, most accumulation sites on Brooks AFB exceed the 55-gallon limits and therefore should be permitted to meet the above requirements.

TABLE 2. EXAMPLE OF A WASTE ANALYSIS PLAN

SHOP (BUILDING)	DESCRIPTION OF WASTE STREAM	Proper Shipping Name	EPA NO.	UN or NA NUMBER	ANALYSIS FREQUENCY	SAMPLING TECHNIQUE	PARAMETERS
Auto Hobby Shop (698)	Waste lube oil from oil changes	Waste petroleum oil, n.o.s., mixture COMBUSTIBLE LIQUID	none	NA1270	Semiannually	COLIWASA	Arsenic Cadmium Chromium Lead Flash point Total Halogens
BX Service Sta. (706)	Waste lube oil from oil changes	Waste petroleum oil, n.o.s., mixture COMBUSTIBLE LIQUID	none	NA1270	Semiannually	COLIWASA	Arsenic Cadmium Chromium Lead Flash Point Total Halogens
Repair & Calib. Lab (167)	Paint wastes inc. solvents	Waste paint related material, mixture/ FLAMMABLE LIQUID	F003 F005	NA1263	Annual	COLIWASA	Flash Point
	Waste hydraulic fluid	Waste oil, n.o.s. (hydraulic fluid)/ COMBUSTIBLE LIQUID	none	NA1270	Each Drum	COLIWASA	Arsenic Cadmium Chromium Lead Flash Point Total Halogens
	Paint Stripper (methylene chloride)	Hazardous Waste, liquid, n.o.s (methylene chloride)/ ORM-E	F002	NA9189	Each Drum	COLIWASA	pH % methylene chloride

Table 3

Container Requirements for Small Quantity Generators⁷

- a. Containers must be inspected at least weekly for leaks and corrosion.
 - b. Containers or tanks must be compatible with the wastes stored in them.
 - c. Leaking containers must be replaced
 - d. Containers must be kept closed during storage (except when necessary to add or remove wastes) and must be handled carefully.
 - e. Incompatible wastes must not be stored in the same container.
 - f. Containers must be clearly marked with the date waste accumulation began and with the words "Hazardous Waste."
 - g. When the drum is full, DRMO requires that the NSN and the major constituents of the waste also be marked on the drum to identify its contents. In addition, it is a good idea to also stencil the name of the shop generating the waste with a telephone extension number so if there are any questions about the waste the Environmental Coordinator or DRMO can easily contact the shop and clear up any questions he has about the waste.
4. The base has one centralized accumulation site (Bldg 1020/1030) for the storage of all wastes on Brooks AFB that should be managed by the Environmental Coordinator. According to OPLAN 19-3, this site should be secured, diked, provide protection for drums from the weather and on an impervious base (e.g., concrete pad). Another option that may be more cost effective than upgrading the centralized accumulation site is to purchase a chemical storage container (see Appendix I for further information on these containers).
5. A characteristic hazardous waste (EP Toxicity)⁵ analysis should be done on neutralized battery acid to document whether all or some of the neutralized acid may be disposed of in this manner. Presently, all neutralized battery acid is disposed of down the drain.
6. The current practice of drumming ethylene glycol antifreeze as a hazardous waste is unnecessary. It can be reclaimed or disposed of down the drain since it is readily biodegradable. This would reduce the amount of hazardous wastes generated on base by 2.11%.
7. SARPMA, USAFSAM, USAFOEHL and the Transportation Squadron currently dispose of waste oil as a hazardous waste through DRMO at a cost to the base. The base should consider getting a recycling contractor similar to the BX Service Station and the Auto Hobby shop to pick up their oil. This contractor is currently buying the used oil for \$0.005-\$0.01/gallon. By obtaining a contractor for waste oil and waste fluids the base can reduce the amount of waste going to DRMO by 79.59%. The contractor could come to the base, pick up the oil and blend it for fuel and eliminate much of the waste disposal effort of the base.

8. The Chief of Safety, the Bioenvironmental Engineer, the Environmental Coordinator and the Fire Department should develop a comprehensive hazardous waste training and education program tailored specifically for the base. This should allow accumulation site managers to become more knowledgeable, responsive and supportive of the hazardous waste program. Specifically, the Bioenvironmental Engineer should discuss health hazards associated with hazardous waste handling and spills. The Environmental Coordinator should explain the program management. Fire Department personnel can give a briefing on fire hazards associated with specific chemicals, and the Safety Officer can brief on how to safely handle and transport hazardous wastes to the centralized accumulation site. These periodic training sessions will answer questions and resolve problem areas.

9. The organization generating hazardous wastes should do a better job identifying and segregating the wastes. Segregating wastes and logging what wastes are placed into each drum would eliminate the need to analyze every drum of wastes before disposal. A baseline chemical analysis needs to be established for each wastestream. Eventually, only a periodic quality assurance analysis would be necessary. A sample form that may be used for logging wastes is shown in Table 4.

10. The wastes from the chemical storage facility, Bldg 135, should be disposed of through a one-time base contract. The contract should include having the contractor drum, label, manifest and dispose of the wastes. Because of the unique types and quantities of chemicals that will be disposed of from the facility, the disposal contract should go out on an open contract. This may be cheaper and probably a lot quicker than going through DRMO who is currently not accepting lab packs for waste. Future disposal of lab packs would either require a base contract or support from DRMO.

11. The Environmental Coordinator should have each laboratory and shop formally assign an accumulation site manager. These managers should be the rank of SSgt (or equivalent civilian rank) or higher who can handle the responsibility of managing these sites.

12. The Power Production Shop should explore recycling their batteries wet (turning in dead batteries with acid in the cells) through a contractor to eliminate the need to neutralize battery acid. In some instances the battery contractor will agree to make a one-for-one exchange (i.e., one new one for one dead one).

13. The washracks at the Auto Hobby shop should be connected to the sanitary sewer to eliminate the discharge from entering the golf course pond. It may be a good idea to have the discharge go through an oil/water separator before entering the sanitary sewer to remove any oils and greases from car washing. In addition, the floor drain in the Auto Hobby shop should also be connected to the same oil/water separator to remove oils and greases that enter the drain from washing the floors.

14. The USAFOEHL/SA Trace Organics Section should triple rinse PCB sample containers containing PCBs with concentrations over 500 ppm before throwing them away as municipal waste. This would assure that containers holding PCB oil over 500 ppm PCBs are not PCB contaminated wastes.

15. The Auto Hobby shop should get the blasting media analyzed to determine if they are throwing a hazardous waste in the trash. If the media has a high metal content the media should be drummed and disposed of as a hazardous waste.

16. The base should start a program to test the integrity of its underground tanks. At a minimum, some kind of inventory control system should be implemented to detect any gross leakage. Especially at the BX Service Station, where one tank is already leaking.

17. The base should drain the leaking tank at the BX Service Station to eliminate any further potential of contaminating the ground around the tank. In addition, this tank should be tested as soon as possible, to find and repair the leak and the contaminated area around the tank should be cleaned up.

Table 4. Example Hazardous Waste Disposal Log

**PAINT SHOP HAZARDOUS WASTE DISPOSAL
LOG FOR DRUM NUMBER: 1**

DATE	TIME	TYPE OF WASTE	AMOUNT OF WASTE
10 Jan 88	1000	Enamel Paint	1 qt
10 Jan 88	1300	Methyl Ethyl Ketone	1 Gal
15 Jan 88	1500	Methyl Ethyl Ketone	1 Gal
20 Jan 88	1100	Polyurethane Paint	1 qt
20 Jan 88	1300	Polyurethane Thinner	1 Gal
25 Jan 88	1330	Methyl Ethyl Ketone	10 Gal
30 Jan 88	0900	Enamel Paint	1 qt
3 Feb 88	1100	Methyl Ethyl Ketone	2 Gal
3 Feb 88	1530	Methyl Ethyl Ketone	2 Gal
6 Feb 88	1130	Enamel Paint	1 qt
6 Feb 88	1130	Methyl Ethyl Ketone	2 Gal
8 Feb 88	1400	Methyl Ethyl Ketone	2 Gal
9 Feb 88	1130	Methyl Ethyl Ketone	2 Gal
11 Feb 88	1400	Methyl Ethyl Ketone	2 Gal
13 Feb 88	1300	Enamel Paint	1 qt
13 Feb 88	1300	Methyl Ethyl Ketone	2 Gal
14 Feb 88	1400	Methyl Ethyl Ketone	2 Gal
16 Feb 88	1130	Enamel Paint	1 qt
16 Feb 88	1130	Methyl Ethyl Ketone	5 Gal
18 Feb 88	1400	Polyurethane Paint	2 qts
18 Feb 88	1400	Polyurethane Thinner	3 Gal
20 Feb 88	1500	Methyl Ethyl Ketone	4 Gal
21 Feb 88	1600	Methyl Ethyl Ketone	1 Gal
28 Feb 88	1630	Enamel Paint	1 Gal
28 Feb 88	1630	Methyl Ethyl Ketone	5 Gal

Total Waste: 50 Gal

Amounts:

Methyl Ethyl Ketone:	43.00 Gal	86.00%
Polyurethane Thinner:	4.00 Gal	8.00%
Enamel Paint:	2.25 Gal	4.50%
Polyurethane Paint:	0.75 Gal	1.5%

REFERENCES

1. "Air Force Military Training Center Management of Hazardous Waste Plan, Lackland AFB, Texas," Aug 1987.
1. "Draft Hazardous Waste Materials Management Plan, Brooks Air Force Base, Texas," 1987.
2. "Chemical Substances Control," Bureau of National Affairs, Inc., Washington DC, 1987
3. "General Instructions for Industrial Solid Waste Reports of the Self-Reporting System," Texas Department of Water Resources, June 1985.
4. "Installation Restoration Program, Brooks AFB. Phase I Records Search," Engineering Science, Atlanta GA, Mar 85.
5. "Waste Minimization Investigation: Brooks AFB, Texas," Earth Technology Corporation, May 1987.
6. United States Environmental Protection Agency, "Identification and Listing of Hazardous Waste," 40 CFR 261.
7. United States Environmental Protection Agency, "Understanding the Small Quantity Generator Hazardous Waste Rules," EPA/530-SW-86-019, September 1986.

APPENDIX A

Request Letter

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS JOINT MILITARY MEDICAL COMMAND - SAN ANTONIO (ATC)
USAF CLINIC, BROOKS
BROOKS AIR FORCE BASE TX 78235-5300

REPLY TO
ATTN OF SGPB (2Lt Weisman, 42020)

22 JUN 1987

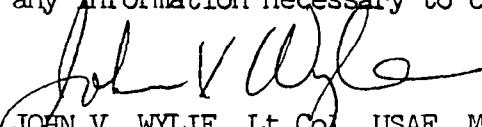
SUBJECT Request for Hazardous Waste Technical Assistance Program

TO HQ ATC/SGPB
USAF OEHL/CC
IN TURN

1. A discussion with Maj NG, OEHL/ECQ, on 12 June 1987 about the hazardous waste technical assistance offered by OEHL revealed the need for this program at Brooks Air Force Base. The Base Environmental Coordinator, Mr Walter Franke, agrees that OEHL assistance is needed to assess the Hazardous Waste Management Program.

2. The survey should address the base Hazardous Waste Program through a review of hazardous waste handling procedures, base hazardous waste management plans, storage, and disposal of hazardous waste to insure compliance with the applicable federal laws. The survey should encompass all functions on Brooks Air Force Base, and include recommended changes to the existing program and opportunities for hazardous waste minimization.

3. The POC at Brooks AFB is 2Lt Wade Weisman, USAF Clinic Brooks/SGPB, ext 42020. He should be contacted directly to coordinate the survey and provide any information necessary to complete the survey.


JOHN V. WYLIE, Lt Col, USAF, MSC
Commander

cc: SGP
6570 ABG/DEPD

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APPENDIX B

Texas Water Commission Uniform
Hazardous Waste Manifest

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TEXAS WATER COMMISSION
P.O. Box 13087, Capital Station
Austin, Texas 78711-3087



Please print or type. (Form designed for use on site (12-gitch) typewriter.)

Form approved. OMB No. 2050-0039, expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No		Manifest Document No.		2. Page 1 of		Information in the shaded areas is not required by Federal law.	
3. Generator's Name and Mailing Address						A. State Manifest Document Number NO 00327722			
4. Generator's Phone ()						B. State Generator's ID			
5. Transporter 1 Company Name				6. US EPA ID Number		C. State Transporter's ID			
7. Transporter 2 Company Name				8. US EPA ID Number		D. Transporter's Phone			
9. Designated Facility Name and Site Address				10. US EPA ID Number		E. State Transporter's ID			
						F. Transporter's Phone			
						G. State Facility's ID			
						H. Facility's Phone			
11A. HM		11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)				12. Containers		13. Total Quantity	
						No. Type		14. Unit Wt/Vol	
								15. Waste Name	
J. Additional Descriptions for Materials Listed Above						K. Handling Codes for Wastes Listed Above			
15. Special Handling Instructions and Additional Information									
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations, including applicable state regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.									
Printed/Typed Name				Signature				Month Day Year	
17. Transporter 1 Acknowledgement of Receipt of Materials						Date			
Printed/Typed Name				Signature				Month Day Year	
18. Transporter 2 Acknowledgement of Receipt of Materials						Date			
Printed/Typed Name				Signature				Month Day Year	
19. Discrepancy Indication Space									
20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19									
Printed/Typed Name				Signature				Date	
								Month Day Year	

TWC-0311 (Rev 11-06-86)

White - original Pink-TSD Facility Yellow-Transporter Green-Generator's first copy

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)		21. Generator's US EPA ID No.		Manifest Document No.	22. Page	Information in the shaded areas is not required by Federal law.	
23. Generator's Name					L. State Manifest Document Number		
					M. State Generator's ID		
24. Transporter _____ Company Name				25. US EPA ID Number		N. State Transporter's ID	
26. Transporter _____ Company Name				27. US EPA ID Number		O. Transporter's Phone	
						P. State Transporter's ID	
						Q. Transporter's Phone	
28A. HM	28. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	29 Containers No.	Type	30. Total Quantity	31 Unit Wt/Vol	R Waste No.	
a.							
b.							
c.							
d.							
e.							
f.							
g.							
h.							
i.							
S. Additional Descriptions for Materials Listed Above		T. Handling Codes for Wastes Listed Above					
32. Special Handling Instructions and Additional Information							
33. Transporter _____ Acknowledgement of Receipt of Materials						Date	
Printed/Typed Name				Signature		Month Day Year	
34. Transporter _____ Acknowledgement of Receipt of Materials						Date	
Printed/Typed Name				Signature		Month Day Year	
35. Discrepancy Indication Space							

APPENDIX C

Letters From Supply Regarding
Waste Disposal

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DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 8570TH AIR BASE GROUP (AFSC)

BROOKS AIR FORCE BASE, TEXAS 78235-5000

REPLY TO
ATTN OF: LGS

18 Feb 87

SUBJECT: Hazardous Material Turn-Ins and Contaminated/Used Liquid Petroleum Products

TO: ABG/LGT ABG/DE ABG/DEMA ABG/DEPD ABG/SS
AFDTL/SUL SAM/TSNM OEHL/SA OEHL/RZ USAF Clinic/SGPB

1. Base Supply has been experiencing problems with turn-ins of the subject materials. The Defense Reutilization and Marketing Activity (DRMO) at Kelly AFB rejects any turn-ins that are not prepared precisely according to regulations.

2. Customers turning in hazardous waste, or contaminated/used liquid petroleum products, are responsible for preparing the following documentation:

- a. DD Form 1348-1, Turn-In Document
- b. AMD Form 641, Lab Analysis Report and Record
- c. EPA Form 8700-22, Uniform Hazardous Waste Manifest

3. Containers must also be properly marked in accordance with 6570th ABG OPLANS 19-1 and 19-3.

4. Instructions for preparation of the DD Form 1348-1 are listed in AFR 67-23, Chap 4, Table 4-1. Contact Base Supply Inspection, Mr Martinez, x3151, if assistance is necessary. Contact ABG/DEPD, Mr Franke, x3252/3255, on completing the EPA Form 8700-22. Contact the Bioenvironmental Engineering Section, Base Medical Section, x2020, on the AMD Form 641.

5. Customers may turn in material directly to the DRMO at Kelly AFB, or may advise Base Supply that assistance is needed. In either case, the forms outlined in 2 above are required, as well as proper marking of the containers.

6. In the future, please ensure all turn-in documentation (AFR 67-23, Chap 4 para 4-5) is properly completed prior to turning in this type of material. The material will not be accepted unless the requirements of para 2 and 3 above are met. POC is Mr Martinez, Base Supply, x3151.

7. The attached is a listing of hazardous materials that must be handled under the Hazardous Waste Program. If a question exists regarding identification, contact the Bioenvironmental Engineering Section, Base Medical Facility (USAF Clinic/SGPB/x2020) for instructions.

Arthur S. Nanos

ARTHUR S. NANOS
Chief of Supply

1 Atch
a/s

OFFICIAL GOVERNMENT COPY



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 6570TH AIR BASE GROUP (AFSG)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

REPLY TO
ATTN OF LG

18 Mar 87

SUBJECT Disposal of Hazardous Waste Material

TO All HSD Commanders (Plus Tenant Units) (Brooks AFB Only)

1. In order to improve our procedures for collection and disposal of hazardous waste material, request those personnel that have this material implement the following procedures immediately. Ensure all hazardous waste materials are collected in segregated containers; that is, vehicle motor oils collected in a separate container from liquid propellants; solvents collected in a separate container from petroleum products; and paints are not to be mixed with solvents and vehicle oils. Wherever possible, materials must be segregated by major material identification and, in no circumstances, should you mix contaminants, such as chemicals or solvents, with petroleum products or paints.
2. Identify the material in each container with the National Stock Number and major noun of the contents. Wherever possible, identify the chemical name of hazardous contaminants and the noun name of non-hazardous contaminants
3. Department of Transportation specified containers are required for storage and movement of hazardous waste. Container requirements are covered in the 49CFR series. Mr Leslie Ford, LGTT, x4-3221, can be contacted for assistance in this area.
4. Proper identification of the waste materials will reduce the high cost of lab analysis required by law prior to disposal. Also, it will enable us to implement a plan to recycle or recover petroleum products and obtain proceeds from the sale of recoverable products by the Defense Reutilization and Marketing Office (DRMO) at Kelly AFB. These funds could then be used in energy conservation and environmental programs.
5. Additional guidance was provided in LGS letter, dated 18 Feb 87, Hazardous Material Turn-Ins and Contaminated/Used Liquid Petroleum Products (attached). You should also review the following to assist you in the proper collection, segregation, storage, and disposal of hazardous material: AFR-19-14 and Chap XXI, DoD 4160.21-M. DoD 4160.21-M is available for review at ABG/DEPD.
6. Direct questions on the proper collection and storage of hazardous waste materials to Mr Walter Franke, DEPD, x4-3252.

GRADEN J. CASTO, Lt Colonel, USAF, MSC
Chief, Logistics Division

1 Atch
ABG/LGS Ltr, 18 Feb 87, w/Atch



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 8970TH AIR BASE GROUP (AFSC)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

17 JUL 1987

REPLY TO
ATTN OF: CC

SUBJECT: Hazardous Property Management

TO: ABG/LG ABG/DE ABG/DEMA ABG/DEPD ABG/SS
AFDTL/SUL SAM/TSNM OEHL/SA OEHL/RZ USAF Clinic/SGPB

1. The following information is provided to assist Brooks personnel in handling, processing, and disposing of hazardous property.

a. WHAT IS A HAZARDOUS WASTE?

Federal law in 40 CFR 261 specifies what are considered hazardous wastes, and therefore subject to hazardous waste regulation. There are two categories in the CFR - those wastes that are listed specifically as hazardous wastes, and those that "exhibit characteristics" of being hazardous. There are four of these characteristics: ignitability, corrosivity, reactivity, and EP toxicity. Each requires a special test (as described in 40 CFR 261.21 through 24). Often, but not always, the label information on the raw material that becomes waste will tell if the residue is hazardous. The base environmental coordinator, Mr Walter Franke (4-3252), or the base bioenvironmental engineer, 2LT Wade Weisman (4-2029), will help in clarification of hazardous waste if there are any questions.

b. WHAT ARE MY RESPONSIBILITIES AS A GENERATOR OF HAZARDOUS WASTE?

It is very important to save the original container and paperwork/label that explains the material, if possible. It is ideal if the original container can be used to hold the material once it becomes waste. Thorough knowledge of the waste material, including National Stock Number or Federal Stock Number, and noun name (preferably the chemical name) of the contents are needed for the disposal process. Federal law requires that hazardous wastes be identified by the user OR through lab analysis. User knowledge will greatly expedite and decrease the cost of the waste disposal process. In addition to being able to properly identify the material, the user should segregate different hazardous wastes. Even though some hazardous wastes can be combined with other wastes, or rendered nonhazardous by dilution with other wastes, the user should check with the environmental coordinator or bioenvironmental engineer before combining any hazardous wastes.

c. WHAT IF I AM NOT REALLY SURE WHAT THE WASTE IS?

Proper identification of the material through using the original paperwork, and segregating the wastes as they are generated, should help alleviate this problem. However, if the user is still unsure, a letter should be sent to the base bioenvironmental engineer at USAF Clinic Brooks/SGPB requesting sample analysis of the material. Even if a sample is

taken, any information which could help in the identification process (i.e., a class or type of chemical that could be present) will aid in the analysis. Once the analysis is complete, results will be sent back to the generator so that the proper paperwork can be filled out and the material turned in.

d. WHAT PAPERWORK DO I NEED TO FILL OUT?

Each container of hazardous waste is required to have an AF Form 1348-1 filled out entirely (just as if the hazardous waste was being purchased). These forms should be available through the Base Publications Office. In addition, a state of Texas regulatory form (EPA Form 8700-22) is required for hazardous waste turn-in. After the 1348-1 is complete, along with the laboratory analysis (IF REQUIRED), the Base Environmental Coordinator (Mr Franke) should be contacted for instructions on filling out the state form.

e. PACKAGING

Property turned into the Defense Property Disposal Office (DPDO) must be in containers that are non-leaking and safe to handle. Questions on the proper container to use should be referred to LGTO, Mr Les Ford, Ext 4-2722.

2. Base Supply does not have the required facilities to store any category of hazardous waste. Activities generating hazardous waste must arrange, through the Base Environmental Engineer (Mr Walter Franke/4-3252), to have the material transported directly to DRMO. (The DRMO will reject any property not properly packaged or labeled.)

3. Any questions about collection, storage, and disposal of hazardous wastes should be directed to Mr Walter Franke, Ext 4-3252, or 2Lt Wade Weisman, Ext 4-2029.

Herbert Klein
HERBERT KLEIN, Colonel, USAF
Base Commander

cc: HSD/EV (Major Binion)

APPENDIX D

Chemical Waste Disposal Survey Form

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Shop:
Shop Supervisor:
Shop Duties:

Building Number:
Autovon: X-

CATAGORIES OF WASTE AND DISPOSAL METHODS			
TYPE OF WASTE	DISPOSAL METHOD	AMOUNT GENERATED (per month)	COMMENTS
1. \$ PAINT WASTE AND THINNERS			
2. \$ STRIPPING WASTE			
3. \$ WASTE ACIDS			
4. \$ SOAPS/CLEANERS			
5. \$ WASTE OIL			
6. \$ WASTE FLUIDS			
7. \$ WASTE FUELS			
8. USED ANTIFREEZE			
9. \$ WASTE SOLVENTS OTHER THAN PD-680			
10. \$ PD-680			
a. USED FOR DEGREASING			
b. USED FOR EQUIPMENT CLEANING			
11. \$ PHOTO WASTES			
12. \$			

\$ specify the types used on next page

Examples of disposal Practices:

D-DRUMMED

RTT-RETURNED TO FUEL TANKS

UIP-USED IN PROCESS

DD-DOWN DRAIN

FTP-TAKEN TO FIRE TRAINING PIT

PIT-PLACED IN TANK

NDD-NEUTRALIZED FIRST THEN PLACED DOWN DRAIN

NA-NOT APPLICABLE

SPECIFIC CHEMICALS USED

PAINT WASTE AND THINNERS

Types	Waste Disposal Method	Amount of Waste Generated	Frequency of Disposal
-------	--------------------------	------------------------------	--------------------------

Paints

Latex			
Polyurathane			
Enamel			

Thinners (list)

DOES THE SHOP USE ANY SAFETY KLEEN UNITS TO CLEAN EQUIPMENT? (YES / NO)
 IF SO HOW MANY UNITS? _____
 CAPACITY OF EACH UNIT: _____

STRIPPERS

Name of Stripper	Manufacturer	Amt used/month or		National Stock Number
		Tank	Change out	
		Cap.	Freq.	

ACIDS

Name of Acid	Manufacturer	Amt used/mo	Disposal Method
Battery Acid	XXXXXXXXXXXX		

SOAPS/CLEANERS

Name of Soap	Manufacturer	Amt used/mo	National Stock Number

Chemical listing (cont.)

OILS/FLUIDS

Type of oil/fluid	Amt used/month	Disposal Method (if waste goes to a Tank give Capacity and location)
Brake Fluid		
Transmission Fluid		
Hydraulic Fluid		
7808 Oil		

SOLVENTS/DEGREASANTS

Name of Chemical	Manufacturer	Amt used/month or		National Stock Number
		Tank Cap.	Change out Freq.	
Carbon Remover				
PD-680 used for Degreasing				XXXXXXXXXXXX
PD-680 used on the Washrack				XXXXXXXXXXXX

DOES THE SHOP USE ANY SAFETY KLEEN UNITS (Y/N)? IF SO HOW MANY: _____
CAPACITY OF EACH UNIT: _____

PHOTO CHEMICALS

Name of Chemical	Manufacturer	Amt/month or		Disposal Method
		Tank Cap.	Change out Freq.	

Chemical listing (cont.)

NDI CHEMICALS

Name of Chemical	Manufacturer	Amt/month or		National Stock Number
		Tank Cap.	Change out/ Freq.	
Emulsifier				
Dye Penetrant				
Developer				

Other Chemicals Not Listed

Name of Chemical	Manufacturer	Amt/month or		National Stock Number
		Tank Cap.	Change out/ Freq.	

SIGNATURE OF PERSON FILLING OUT THE FORM: _____

APPENDIX E

Wastes Generated on Brooks AFB

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WASTES GENERATED ON BROOKS AFB

CATEGORY 1: WASTE OILS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Vehicle Maintenance	1102	Waste Oils	2000.000
Fabrications	130	Cutting Oil	5.000
SARPMA Climate Control Heating Plant	65	Waste Oils	300.000
Fabrications	130	Lubricating Oil	5.000
Auto Hobby Shop	698	Waste Oils & Fluids	1800.000
BX Service Station	706	Waste Oil & Fluids	1200.000
SARPMA Power Production	629	Waste Oil	48.000
SARPMA Climate Control	633	Waste Oil	24.000
USAFOEHL/SA	140	Waste Oils	360.000
Repair and Calibration Lab	167	Vacuum Pump Oil	12.000
SARPMA Electric Shop	629	*PCB Contaminated Oil	--
TOTAL:			5754.000

CATEGORY 2: PHOTO WASTES

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Still Photography	130	Stop Bath	12.000
Still Photography	130	Reverse Bath	240.000
Still Photography	130	Developer	1045.000
Still Photography	130	Stabalizer	840.000
Still Photography	130	Bleach	204.000
Still Photography	130	Conditioner	240.000
USAFOEHL/SA	140	Photo Wastes	12.000
Still Photography	130	Fixer	648.000
Still Photography	130	Activator	144.000
TOTAL:			3385.000

CATEGORY 3: WASTE PAINTS AND THINNERS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
SARPMA Climate Control Heating Plant	165	Paint Waste	3.000
Chemical Defense	170	Paint Wastes	1.000
Systems Engineering	170	Latex Paints	12.000
Vehicle Maintenance	1102	Paint Waste	24.000
Vehicle Maintenance	1102	Waste Thinners	36.000

CATEGORY 3 (Continued)

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
SARPMA Paint Shop	629	Latex Paints	30.000
USAFOEHL/SA	140	Paint Waste	60.000
USAFOEHL/SA	140	Waste Thinners	60.000
SARPMA Paint Shop	629	Enamel Paints	25.000
Repair and Calibration Lab	167	Waste Thinners	120.000
TOTAL:			371.000

CATEGORY 4: WASTE ACIDS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
USAFOEHL/SA	140	Waste Battery Acid	60.000
SARPMA Power Production	629	Battery Acid	60.000
SARPMA Climate Control	633	Waste Acids	24.000
Repair and Calibration Lab	167	Hydrachloric Acid	12.000
Drug Testing Lab	930	Acids	60.000
USAFOEHL/SA	140	Waste Acids	12.000
Fabrications	130	15% Sulfuric	50.000
Fabrications	130	5% Nitric Acid	25.000
TOTAL:			303.000

CATEGORY 5: USED ANTIFREEZE

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Auto Hobby Shop	698	Used Antifreeze	60.000
USAFOEHL/S	140	Used Antifreeze	18.000
Vehicle Maintenance	1102	Used Antifreeze	48.000
BX Service Station	706	Used Antifreeze	36.000
Crew Systems	170	Used Antifreeze	2.000
SARPMA Power Production	629	Used Antifreeze	60.000
TOTAL:			224.000

CATEGORY 6: WASTE STRIPPERS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
SARPM Paint Shop	629	Strypeeze	6.000
Repair and Calibration Lab	167	Magnaflux Stripper	50.000
USAFOEHL/SA	140	Waste Strippers	120.000
TOTAL:			176.000

CATEGORY 7: WASTE SOLVENTS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Crew Systems	170	Acetone	4.000
Systems Engineering	170	Carbon Remover	2.000
USAFOEHL/SA	140	Solvents	36.000
USAFOEHL/SA	140	Degreasants	36.000
Fabrications	130	PD-680 (degreasing)	25.000
TOTAL:			103.000

CATEGORY 8: WASTE FLUIDS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Repair and Calibration Lab	167	Hydraulic Fluid	3.000
Vehicle Maintenance	1102	Transmission Fluid	30.000
Vehicle Maintenance	1102	Brake Fluid	18.000
USAFOEHL/SA	140	Waste Fluids	36.000
Vehicle Maintenance	1102	Hydraulic Fluid	12.000
TOTAL:			99.000

CATEGORY 9: WASTE FUELS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
USAFOEHL/SA	140	Jet Fuel	24.000
SARPM Power Production	629	Waste Fuels	12.000
USAFOEHL/SA	140	Automotive Fuel	10.000
Vehicle Maintenance	1102	Automotive Fuel	4.000
TOTAL:			50.000

CATEGORY 10: MISC CHEMICALS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Drug Testing Lab	930	Iodine 125	2880.000
Crew Systems	170	Molecular Sieve	120.000
Chemical Defense	170	Hydrolysis Soln.	4.000
SARPMA Climate Control	633	Sodium Nitrate	120.000
Fabrications	130	Black Dye	50.000
Fabrications	130	Sandofix	50.000
TOTAL:			3224.000

CATEGORY 11: SOAPS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Drug Testing Lab	930	Soaps	12.000
Auto Hobby Shop	698	Soaps	12.000
Systems Engineering	170	Soaps	120.000
Chemical Defense	170	Soaps	2.000
Vehicle Maintenance	1102	Aircraft Soap	480.000
BX Service Station	706	666 Cleaner (Soap)	240.000
SARPMA Climate Control	633	Soaps	48.000
USAFOEHL/SA	140	Soaps	60.000
SARPMA Power Production	629	Soaps	3.000
TOTAL:			977.000

CATEGORY 12: SAFETY KLEEN UNIT(S)

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
BX Service Station	706	Safety Kleen Unit	1.000
SARPMA Power Production	629	Safety Kleen Unit	1.000
Vehicle Maintenance	1102	Safety Kleen Unit	2.000
Auto Hobby Shop	698	Safety Kleen Unit	1.000
TOTAL:			5.000

*NOTE: PCB contaminated oil varies depending on the number of transformers removed per month.

APPENDIX F

Wastes Generated on Brooks AFB
And Sent to DRMO

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WASTES GENERATED ON BROOKS AFB AND SENT TO DRMO

CATEGORY 1: WASTE OILS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Pavements and Grounds	609	Waste Motor Oil	110.000
SARPMA Power Production	629	Waste Oil	48.000
Vehicle Maintenance	1102	Waste Oils	2000.000
USAFOEHL/SA	140	Waste Oils	360.000
Repair and Calibration Lab	167	Vacuum Pump Oil	12.000
SARPMA Electric Shop	629	PCB contaminated Oil	0.000
SARPMA Climate Control Heating Plant	165	Waste Oils	300.000
SARPMA Climate Control	633	Waste Oil	24.000
TOTAL:			2854.000

CATEGORY 2: PHOTO WASTES

All photo wastes are eventually placed down the drain.

CATEGORY 3: WASTE PAINT AND THINNERS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
SARPMA Climate Control Heating Plant	165	Paint Waste	3.000
SARPMA Paint Shop	629	Enamel Paints	25.000
SARPMA Paint Shop	629	Latex Paints	30.000
Repair and Calibration Lab	167	Waste Thinners	120.000
USAFOEHL/SA	140	Paint Waste	60.000
Vehicle Maintenance	1102	Paint Waste	24.000
USAFOEHL/SA	140	Waste Thinners	60.000
Vehicle Maintenance	1102	Waste Thinners	36.000
TOTAL:			358.000

CATEGORY 4: WASTE ACIDS

All acids are neutralized and placed down the drain

CATEGORY 5: USED ANTIFREEZE

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
SARPMA Power Production	629	Used Antifreeze	60.000
USAFOEHL/SA	140	Used Antifreeze	18.000
TOTAL:			78.000

CATEGORY 6: WASTE STRIPPERS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Repair and Calibration Lab	167	Magnaflux Stripper	50.000
USAFOEHL/SA	140	Waste Strippers	120.000
TOTAL:			170.000

CATEGORY 7: WASTE SOLVENTS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
USAFOEHL/SA	140	Degreasants	36.000
USAFOEHL/SA	140	Solvents	36.000
Fabrications	130	PD-680 (degreasing)	25.000
TOTAL:			97.000

CATEGORY 8: WASTE FLUIDS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
Vehicle Maintenance	1102	Hydraulic Fluid	12.000
Repair and Calibration Lab	167	Hydraulic Fluid	3.000
USAFOEHL/SA	140	Waste Fluids	36.000
Vehicle Maintenance	1102	Transmission Fluid	30.000
TOTAL:			81.000

CATEGORY 9: WASTE FUELS

SHOP/LABORATORY	BLDG	PRODUCT	QTY(GALLONS)
USAFOEHL/SA	140	Jet Fuel	24.000
USAFOEHL/SA	140	Automotive Fuel	10.000
Vehicle Maintenance	1102	Automotive Fuel	4.000
SARPMA Power Production	629	Waste Fuels	12.000
TOTAL:			50.000

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APPENDIX G

Waste Disposal Practices by
Shop and Laboratory

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DISPOSAL PRACTICES BY LABORATORY AND BY SHOP FOR BROOKS AFB

Page 1

1. Air Base Group

Type of Shop: Auto Hobby Shop

Building Number: 698

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Used Antifreeze	60.000	DD
Safety Kleen Units	1.000	C
Soaps	12.000	DD
Waste Oils & Fluids	1800.000	UGT
TOTAL:	1872.000	

Type of Shop: BX Service Station

Building Number: 706

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
666 Cleaner (Soap)	240.000	DD
Used Antifreeze	36.000	DD
Safety Kleen Units	1.000	C
Waste Oil and Fluids	1200.000	UGT
TOTAL:	1476.000	

Type of Shop: Vehicle Maintenance

Building Number: 1102

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Hydraulic Fluid	12.000	D
Automotive Fuel	4.000	D
Used Antifreeze	48.000	DD
Brake Fluid	18.000	RDD
Safety Kleen Unit	2.000	C
Paint Waste	24.000	D
Waste Thinners	36.000	D
Aircraft Soap	480.000	RDD
Waste Oils	2000.000	D
Transmission Fluid	30.000	D
TOTAL:	2654.000	

2. Drug Testing Laboratory

Type of Lab: Drug Testing Lab

Building Number: 930

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Iodine 125	2880.000	D
Acids	60.000	DD
Soaps	12.000	DD
TOTAL:		2952.000

3. USAF Occupational and Environmental Health Laboratory

Type of Lab: USAFOEHL/SA

Building Number: 140

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Waste Battery Acid	60.000	DD
Solvents	36.000	D
Waste Acids	12.000	DD
Jet Fuel	24.000	D
Degreasants	36.000	D
Waste Thinners	60.000	D
Photo Wastes	12.000	DD-D
Waste Oils	360.000	D
Soaps	60.000	DD
Automotive Fuel	10.000	D
Paint Waste	60.000	D
Waste Fluids	36.000	D
Waste Strippers	120.000	D
Used Antifreeze	18.000	D
TOTAL:		904.000

4. USAF School of Aerospace Medicine

Type of Shop: Fabrications

Building Number: 130

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
15% Sulfuric	50.000	NDD
Lubricating Oil	5.000	UIP
5% Nitric Acid	25.000	NDD
Cutting Oil	5.000	UIP
Black Dye	50.000	RDD
Sandofix	50.000	RDD
PD-680 (degreasing)	25.000	D
TOTAL:	210.000	

Type of Shop: Still Photography

Building Number: 130

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Reverse Bath	240.000	DD
Conditioner	240.000	DD
Bleach	204.000	DD
Fixer	648.000	SRDD
Stabilizer	840.000	DD
Activator	144.000	DD
Stop Bath	12.000	DD
Developer	1045.000	DD
TOTAL:	3373.000	

Type of Lab: Repair and Calibration Lab

Building Number: 167

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Magnaflux Stripper	50.000	D
Waste Thinners	120.000	D
Vacuum Pump Oil	12.000	D
Hydrochloric Acid	12.000	DD
Hydraulic Fluid	3.000	D
TOTAL:	197.000	

Type of Lab: Chemical Defense

Building Number: 170

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Soaps	2.000	DD
Hydrolysis Soln.	4.000	DD
Paint Wastes	1.000	UIP
TOTAL:		7.000

Type of Lab: Crew Systems

Building Number: 170

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Used Antifreeze	2.000	DD
Molecular Sieve	120.000	PIT
Acetone	4.000	DD
TOTAL:		126.000

Type of Lab: Systems Engineering

Building Number: 170

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Soaps	120.000	DD
Carbon Remover	2.000	DD
Latex Paints	12.000	DD
TOTAL:		134.000

5. San Antonio Real Property Management Association

Type of Shop: SARPMA Climate Control Heating Plant

Building Number: 165

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Paint Waste	3.000	D
Waste Oils	300.000	D
TOTAL:		303.000

Type of Shop: Pavements and Grounds

Building Number: 609

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Safety Kleen	2.000	C
Waste Motor Oil	110.000	D
TOTAL:		110.000

Type of Shop: SARPMA Electric Shop

Building Number: 629

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
PCB contaminated Oil	Varies on number of transformers removed per month	D
TOTAL:		

Type of Shop: SARPMA Paint Shop

Building Number: 629

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Latex Paints	30.000	D
Strypeeze	6.000	UIP
Enamel Paints	25.000	D
TOTAL:		61.000

Type of Shop: SARPMA Power Production

Building Number: 629

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Safety Kleen Units	1.000	C
Battery Acid	60.000	NDD
Waste Fuels	12.000	D
Waste Oil	48.000	D
Soaps	3.000	UIP
Used Antifreeze	60.000	D
TOTAL:		183.000

Type of Shop: SARPMA Climate Control

Building Number: 633

WASTE PRODUCT	QTY (GALLONS)	DISPOSAL
Waste Acids	24.000	DD
Sodium Nitrate	120.000	DD
Soaps	48.000	DD
Waste Oil	24.000	D
TOTAL:		216.000

Legend:

Number of degreasing units in the shop. Safety Kleen units are not included in totals since they are serviced by a contractor.

- C: Contractor
- D: Drummed
- D-DD: Drummed, and rinsewater goes down the drain
- DD: Down the drain
- NDD: First neutralized and then poured down the drain
- PIT: Placed in trash
- RDD: Rinsed down the drain
- SRDD: Silver recovery unit and the effluent goes down the drain
- UIP: Used up in process
- UGT: Underground Tank

APPENDIX H
Accumulation Sites

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ACCUMULATION SITES (Organization, Location, Waste, Description)

1. SARPMA Climate Control (Heating Plant)
 - Located under cooling tower 3
 - 10 waste oil drums
 - Concrete pad, covered, no curbs, secure
2. Repair and Calibration Lab
 - Exterior site, east of Bldg 167
 - Waste stripper (5 Drums), waste oil (5 Drums)
 - Concrete pad, covered, curbs, not secure
3. Low-Level Waste Radioisotope Accumulation Site
 - Exterior site, north of Bldg 186
 - Various materials containing low level radiation
 - Exterior storage on ground, secure, not covered
4. SARPMA Pavements and Grounds
 - Exterior site, west of Bldg 609
 - Waste oil (1 Drum)
 - Concrete pad, not secure, not covered, curb on 3 sides
5. SARPMA Paint Shop and Power Production Accumulation Site
 - Exterior site, north of Bldg 629
 - Paint waste and thinners (4 Drums), waste oil (4 Drums), good fuel (1 Drum), PD-680 (1 drum never opened)
 - Exterior storage on concrete, not curbed, not secure
6. Supplies Accumulation Site
 - Bldg 1020/1030
 - Exterior site, behind horse stables
 - PCB waste oil and transformers
 - Exterior site on ground, secure, not covered, not curbed
7. Vehicle Maintenance
 - Exterior site, southeast of Bldg 1102
 - Paint waste (1 Drum), contaminated Fuel (1 Drum), Waste oil (4 Drums), 1 pallet of used batteries
 - Exterior storage on pavement, secure, not curbed
8. Auto Hobby Shop
 - Underground 500-gallon tank, exterior of Bldg 698
 - Waste motor oil and transmission fluid
9. BX Service Station
 - Underground 350-gallon tank, exterior of Bldg 706
 - Waste motor oil and transmission fluid

10. Defense Reutilization and Marketing Office (DRMO)

- Storage of BAFB Hazardous Wastes (<1% of all wastes stored at DRMO at East Kelly AFB), the remainder consists of waste from Randolph AFB, Lackland AFB, Kelly AFB, and Fort Sam Houston)
- Exterior/Interior site, new facility in excess of 1 million dollars.
- Exterior/Interior storage on concrete, diked, covered, secure, fire protection, and phones.

APPENDIX I

Information about Chemical Storage Containers

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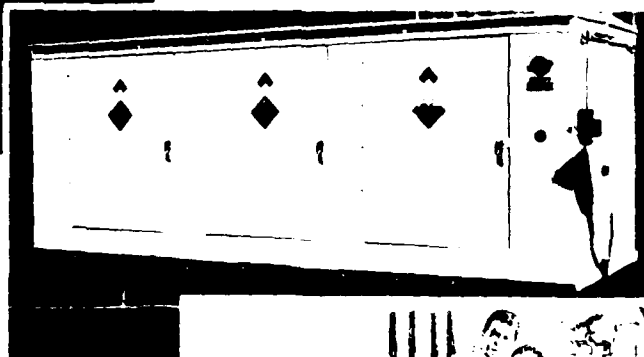
CHEMICAL STORAGE CONTAINERS*



SAFETY STORAGE CONTAINERS comply with **New Regulations** . . .

Safety Storage containers have been carefully designed and constructed to comply with NFPA standards and OSHA regulations. They also meet State Department of Health Services requirements for storing hazardous wastes in a secured enclosure. Our containers' high quality design standards are consistent with local Hazardous Material Storage Ordinances requiring hazardous chemicals to be stored in secondary containment structures to prevent spills or leaks from contaminating groundwater.

* Patent Pending



SAFETY STORAGE, INC.



18900 Stevens Creek Blvd.
Cupertino, CA 95014
408/252-2750



SAFETY STORAGE CONTAINERS

Construction Features:

Standard Design

- Safety Storage Containers are specifically designed "from the ground up" for hazardous material storage.
- These sturdy units are constructed of 10, 12, and 14 gauge ASTM-A569 steel to provide maximum structural strength and security.
- Storage units have a secondary spill containment capacity of 500 gallons.
- Thirty 55-gallon drums can be conveniently stored inside each storage container.
- Maximum storage capacity is 20,000 lbs. (10 tons). This includes chemicals in drums, boxes on pallets, 5 gallon cans or various other sizes.
- Storage units can be loaded with chemical containers using a forklift or by manual means.
- The interior is protected from chemical attack by a resistant epoxy coating.
- Outside dimensions (height, width, length) are 8'x8'x22'.
- Static grounding connection is installed on each unit to protect flammable liquids from ignition by electrical discharge.
- The spill containment subfloor is designed to prevent escape of hazardous liquids and solids. The subfloor is constructed of continuously welded 12 gauge steel which is cleaned, primed and coated with epoxy for chemical resistance. The roof is designed to act as a pressure relief structure in the event of an explosion. Released gases would be directed upwards and out the roof area rather than collapsing the front or side walls. The roof is connected to the container to prevent a missile hazard. The construction is of 14 gauge steel with 10 gauge supports, reinforced by 3" steel channel sections.
- Standard floors are 1 1/2" thick commercial grade plywood. The floor panels are treated with fire retardant and coated with two coats of epoxy paint. Floors are equipped with removable sections to permit visual inspection for leaks or spills.
- Fire protection is provided with a 2 1/2" water line and 3 fire sprinkler heads. A 2 1/2" NPT fitting is located outside the container for fire department hookup.

Optional Features

- An explosion-proof ventilation system prevents the accumulation of flammable and toxic fumes. This system is composed of a Class I, Division I, totally enclosed explosion-proof motor. The fan has non-sparking aluminum blades. The associated ductwork is constructed of epoxy coated steel and equipped with exhaust vents. This system exceeds OSHA's requirements of 6 air changes/hour.
- Explosion-proof lighting is available. These Class I, Division I totally enclosed fixtures provide safety lighting for chemical handling personnel.
- Safety shower/eyewash units can be permanently installed where an external water hookup is available. Self-contained pressurized units can also be provided.
- Fiberglass floor grating is available for corrosive storage applications.
- A spill containment sump liner constructed of fiberglass can be installed for additional protection in the event of corrosive spills.
- A dry chemical fire protection system will provide the suppression capability to combat most chemical fires. These units use a dry chemical agent that interferes with the chemical reaction of the fire and is the most effective and efficient extinguishing agent available.
- The explosion-proof electrical wiring system is installed in compliance with NEC, NFPA, and NEMA requirements.
- Storage shelves constructed of heavy gauge epoxy coated steel can be installed for convenient storage of small chemical containers. These shelves are 15 inches wide and attached to side and back walls at a height of 4 feet above the floor.
- Temperature controlled containers can be custom fabricated to provide protection for new temperature sensitive chemicals.

SAFETY STORAGE CONTAINERS COST BENEFITS:

Pre-fabricated storage containers are cost effective and more economical than comparable cinder block and concrete structures. You can avoid costly delays in meeting hazardous material storage regulations by ordering Safety Storage units. These facilities are ready for use upon delivery. Units can be located near shipping docks or other convenient and accessible locations. Cost savings result from reduced material handling time and lower material loss rates. The company insuring you against loss will appreciate your efforts to reduce your exposure to chemical risks.

Lease Program

Industrial Leasing Corporation, founded in 1957, is one of the Nation's oldest diversified equipment leasing firms. Leasing chemical containers can help you solve your chemical storage needs now, while conserving your capital for other important uses. We can assist you in obtaining these chemical storage units by providing you with information about a leasing plan. Industrial Leasing Corporation provides nationwide leasing services.

ORDERING SAFETY STORAGE CONTAINERS:

Our sales representatives are experienced in helping you solve your chemical storage problems using Safety Storage containers. They will assist you in developing your chemical storage plan and prepare detailed sketches and specifications for your individual container requirements. A written quotation will be provided outlining the cost for the items you require. Our manufacturing plants will commence preparing your containers for delivery upon confirmation of your purchase order. We have provided Safety Storage containers to the U.S. Government, major universities and Fortune 500 manufacturers throughout the United States and can provide specific references upon request. Safety Storage containers are available for immediate delivery throughout the United States.



18970 Stevens Creek Blvd
Cupertino, CA 95014
415-252-2750

MODEL 22 SAFETY STORAGE CONTAINER PRICELIST
(Effective Date 10/1/85)

A) Model 22 Safety Storage Container..... \$12,000.00

- * Outside Dimensions (L x W x H): 22' x 8'6" x 8'3"
- * Internal Chemical Resistant Epoxy Coating
- * Internal Spill Containment Capacity: 500 Gallons
- * Epoxy Coated Plywood Floor (Thickness: 1 1/2")
- * Three Doors with Safety Locks
- * Pressure Relief Roof
- * Static Grounding Connection
- * Fire Sprinkler System with Three Sprinkler Heads
- * Fire Department Hookup (2 1/2" NPT Fitting)
- * Three D.O.T. Placards (Permanent)
- * Three NF 704M Rating Signs (Pressure Sensitive)
- * Maximum Storage Capacity: 20,000 lbs.

B) Electrical Options:

- | | |
|--|----------|
| 1. Explosion-Proof Wiring System..... | 1,500.00 |
| 2. Explosion-Proof Ventilation System..... | 850.00 |
| 3. Explosion-Proof Light (Interior)..... | 250.00 |
| 4. Explosion-Proof Light (Exterior)..... | 500.00 |
| 5. Liquid Level with Alarm..... | 750.00 |
| 6. Temperature Control System..... | * |

C) Fire Protection Option:

- | | |
|--|----------|
| 1. Dry Chemical Fire Suppression System..... | 2,950.00 |
|--|----------|

D) Structural Options:

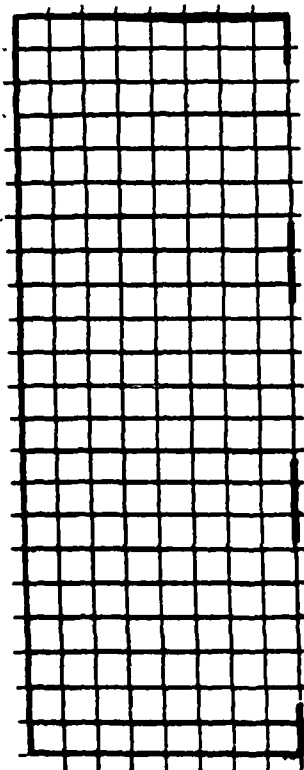
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|---|----------|
| 1. Shelving (per lineal foot)..... | 22.00 |
| 2. Chemical Separation Wall, Metal..... | 650.00 |
| 3. Chemical Separation Wall, 2-Hour Fire Rated..... | 1,000.00 |
| 4. Fiberglass Floor Grating (per container)..... | 4,533.00 |
| 5. Fiberglass Floor Grating (per compartment)..... | 1,511.00 |
| 6. Polypropylene Sump Liner (per container)..... | 1,200.00 |
| 7. Polypropylene Sump Liner (per compartment)..... | 400.00 |
| 8. Doors on Back (each additional)..... | 1,000.00 |
| 9. Permanent D.O.T. Placard (each additional)..... | 80.00 |

E) Miscellaneous Options:

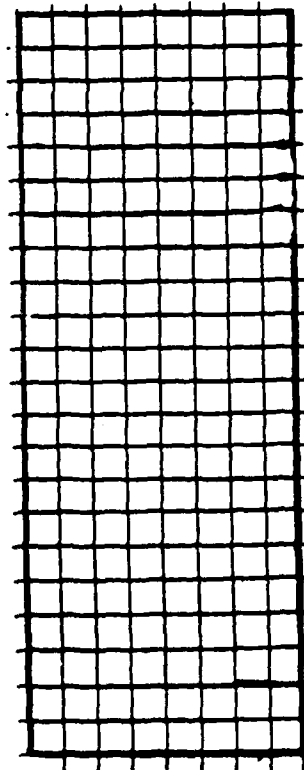
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|---|--------|
| 1. Emergency Eye/Face Wash Fixture..... | 275.00 |
| 2. Portable Eye/Face Wash..... | 750.00 |
| 3. Access Ramp..... | 850.00 |

Safety Storage requires a 35% deposit with each order. The balance is due upon delivery. Our present delivery time is approximately three weeks from receipt of a purchase order and deposit.

* The price for a temperature control system is available upon request



TOP VIEW



FRONT VIEW

- DC: Dry Chemical System
 EB: Electrical Breaker Box
 EF: Exhaust Fan
 FB: Fire Department Makeup
 FG: Fiberglass Floor Grating
 FH: 2-Hour Fire Wall
 HC: Rustic Branding Convention
 H: Hose Reel System
 K: Kitchen
 M: Metal Wall
 P: Permanent Placard
 PL: Plywood Floor (1/2")
 S: Shelf
 SB: Shaver/Eyeshed Fixture
 SC: Sprinkler Head
 ST: Stair
 T: Tank



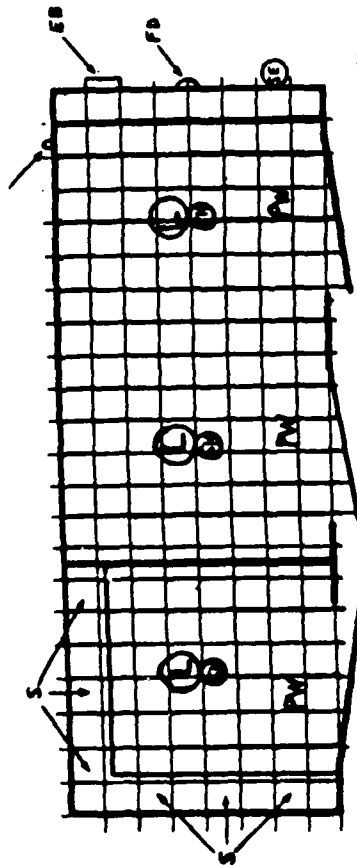
SAFETY STORAGE

FOR:

FRONT:

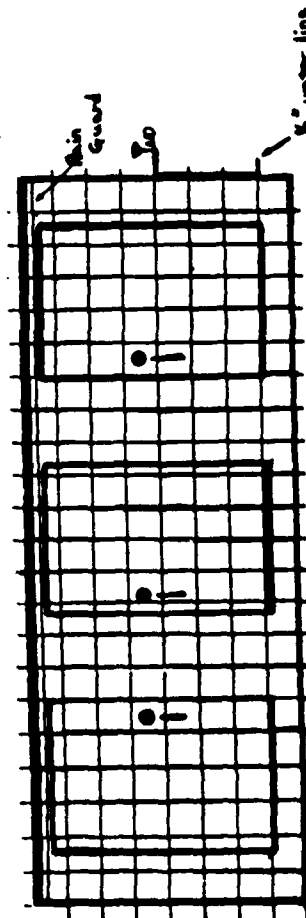
BT:

- AC: Dry Chemical System
 EB: Electrical Breaker Box
 EP: Exhaust Fan
 FB: Fire Suppression System
 FD: Fire Door
 FG: Fire Glass
 FH: Fire Hose
 FI: Fire Alarm
 FJ: Fire Alarm Control
 FK: Fire Alarm Panel
 FL: Fire Alarm Bell
 FM: Fire Alarm Bell
 FN: Fire Alarm Bell
 FO: Fire Alarm Bell
 FP: Fire Alarm Bell
 FQ: Fire Alarm Bell
 FR: Fire Alarm Bell
 FS: Fire Alarm Bell
 FT: Fire Alarm Bell
 FU: Fire Alarm Bell
 FV: Fire Alarm Bell

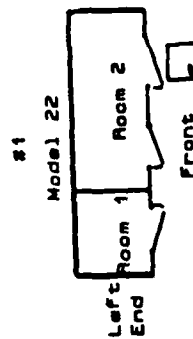


TOP VIEW

- Notes:
 1) Use treated steel & stainless steel hinges
 2) Equip with a rain guard
 3) Plywood Floor (1/2")
 4) Install a shelf in room 1 (left & back walls)
 5) Install one metal chemical separation wall
 6) Manufacture and provide one access ramp



FRONT VIEW



access ramp
 Front
 SAFETY STORAGE

FRONT:
 BACK:
 SIDE:

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